SUPPLEMENT.

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FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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ANNUAL REVIEW OF THE METAL TRADE.

It is long since a year has passed which has presented so few topics of interest, or been so barren of events in the commercial world as the year 1867. One thing alone has made it remarkable, and will cause it, probably, long to be remembered—and this is, an almost unvarying depression which has remained upon business throughout almost the entire year. The shadow of the previous year, which had been so full of untoward events, seemed to have fallen upon the one now passing away, and filled it with despondency, want of confidence, and doubt. Business appeared gradually to languish away, and a kind of stagnation to come over the various markets. Persons could not be induced to enter into operations, and only such transactions as were almost imperative were entered into. Speculation entirely ceased, as no one felt sufficient confidence in the state of affairs to engage in operations the result of which it was quite impossible to foresee, and which there seemed every probability would result in loss instead of profit; and although there were some circumstances which seemed calculated to facilitate these operations, yet such was the general gloom that they failed in promoting any improvement. One thing has been very favourable throughout the year, and, under other circumstances, would have undoubtedly led to an extensive business; this has been the easiness of the Money Market, and the lowness of the Bank rate of discount. Early in the year the rate was reduced to 3 per cent., then in about three months afterwards to 2½ per cent., and in two months after that to 2 per cent., at which it has remained from the 25th July to the present time. Had business been in its normal state, this very low rate of interest would have greatly facilitated transactions, and it would have been found that parties would have taken advantage of it to enter into extensive operations, especially as prices have been generally very low during the year, and much under the average; but, unfortunately, these facilities have been unavailing, and have not been able to overcome the superincumbent weight of depression and dulness which has rested upon trade throughout the year. It is a cause of much congratulation that these untoward events have been bravely met, few comparatively having succumbed, and, generally speaking, all parties have been disposed patiently to wait until a change for the better should occur, and the present clouds of despondency pass away, and a brighter and more cheerful prospect be presented; and it is a proof of the general soundness of trade that this depression, which has lasted for so unprecedented a period, has been borne with so much courage and patience, and with such faith in the ultimate recovery of business, and its eventual return to its former activity and vigour.

The political events which have had most influence upon the Metal Trade during the year were, first, the fear which at one time was entertained that a war would take place between France and Prussia; this appeared more than probable, as each country seemed to be jealous of each other, and to be desirous of appealing to arms to decide which should stand pre-eminent in Europe. This could have been the only true reason, as the one put forward was certainly not sufficient to justify so terrible a contest as it must have been had these two great military powers persisted in striving for the mastery in arms. Fortunately, however, for Europe this was not to be—the horrors of war were to be spared, valuable lives were not to be sacrificed, society was not to be convulsed, and trade was not by this means to be further depressed. To the energies of the British Foreign Secretary it is principally due that these calamities were prevented. A conference on the Luxemburg question was proposed, and accepted by the contending parties, who met in London, at which the principal differences were arranged, and hostilities prevented; and thus passed away that which could not have taken place without causing the greatest injury not only to the principals in the affair but to Europe generally, while it would have inflicted incalculable mischief upon commercial affairs.

The attempt to assassinate the Emperor of Russia in Paris was another event, the failure of which was most providential, as had it been successful there is no saying what unfortunate consequences might have resulted from it—consequences which doubtless would have been wide-spread, and which would certainly have tended further to depress trade generally. The last event, which at one time seemed to look very unpropitious, was the late invasion by Garibaldi of the Papal States, and the attempt to obtain possession of Rome. The feeble efforts made by the Italian Government to check this attempt, and the excuse put forward by them for not being more active, caused the Emperor of the French to enter upon the scene, and to send an army to support the Pope and preserve him in his temporal power; upon which the Italian Government also sent an army into the Papal States. Great fears were entertained that a collision might take place between them, and hints were dropped that should this event happen the Prussians would immediately proceed to the support of the Italians. This was sufficiently alarming, and had all this taken place no doubt a fierce war would have resulted, and all the calamities which earlier in the year had been hoped to have been prevented would have returned with renewed force. Most fortunately, however, all parties seem to have miscalculated the results. Instead of Garibaldi and his volunteers overcoming the Papal troops, the latter proved victorious, although there is no doubt they were greatly assisted by some of the French soldiers; and the capture of Rome, which was thought to be so easy, was entirely prevented. The collision which it was asserted must take place between the French and Italian armies did not occur; and after the defeat of Garibaldi and his volunteers the Italian army quietly withdrew from the Papal territory, and the French army proceeded to retire also from Rome. Thus, war was again averted from Europe, and the peaceful relations of the continental powers remained undisturbed. Unfortunately, however, the prospect of war acted most prejudicially to business, and tended to retard any improvement which might otherwise have taken place, and which at one time seemed as rather likely to occur.

The year has been occasionally relieved by gleams of sunshine, and hopes have several times been entertained that commercial affairs were about to take a turn for the better—a little spurt in business has now and then occurred; and for a short time the metal trade has resumed its activity. Unfortunately, however, this improvement has lasted but a little time—the sun has disappeared after a brief glance, and shadows have again come over its surface, and business has once more relapsed into its former dulness. These repeated disappointments, however, though exceedingly trying, show that there is still vitality in the trade, and prevent parties from yielding entirely to despair of a revival taking place in the future.

It cannot be said that at present the prospect is very encouraging, still it can hardly be supposed that this unsatisfactory condition of the metal market will continue much longer—a change for the better must come; and it is earnestly to be hoped that with the new year a marked revival may be inaugurated, and a permanent and lasting improvement in the trade take place; and that it may not be for many years that so unfavourable a record may have to be made of the results of the metal trade during the year; but that at the conclusion of the year which will speedily dawn upon us we may have to notice a complete contrast to the present, and be enabled to point to it as one of the most prosperous which has ever passed over us; and that in its successes we may forget the gloom and depression of the year which is now passing away, and be enabled to rejoice in the continuance of peace amongst the nations of the earth, and of extending and enlarged triumphs achieved by commerce in ameliorating the condition, and promoting the happiness and contentment of all mankind.

COPPER.—The present year will be memorable in the copper trade, from the fact that about the middle of January the Copper Smelters' Association, which had existed for a number of years, and been the means of causing a complete monopoly in the trade, so that it was impossible for any parties not belonging to the Association to engage in the trade, was at length, and finally, broken up. The cause of this event was not, of course, made public, but, doubtless, it was in consequence of it being found that some of the members persisted in selling under the official prices, thus counteracting the intention of the Association that the prices, as fixed by them, should be observed by all the members; however, the monopoly was at end, and all parties in the copper trade were free to sell at whatever prices they thought fit. There is no doubt that all monopolies are bad, and injurious to trade, and the copper monopoly was no exception to the rule, and there is very little question that, had business been in its normal condition, it would have been found that great benefits had resulted from the destruction of this monopoly; however, such has been the condition of trade throughout the year that it has been impossible to ascertain what advantages have resulted from this change. It may, however, fairly be expected that when a revival in trade takes place, and orders for copper become more abundant, it will be seen that great good has been caused by this important alteration in the condition of the copper trade. For a short time after the break up of the Association the market continued very inactive, arising in great measure from the uncertainty which existed as to what would be the result of this measure; but after a time it became steadier, and prices began to assume a firmer character. Towards the middle of February the market became very much depressed, in consequence of advices received from Chili, stating that shipments equal to 2000 tons of copper were being made to this country, and 600 tons to the United States; prices assumed a downward tendency, and Chili slab was sold at 75*l.* to 75*l.* 10s., Burra at 85*l.*, and Wallaroo at 84*l.* 10s. In March the market still continued dull, and sales were of a very limited amount. The shipments from Chili still continued large, which tended to cause the market to remain in a dull condition; but for a short time a better feeling sprung up, and more business was done both in English and foreign. Towards the close of the month, however, the market again became very dull and lifeless, prices were very uncertain, and parcels in second hands could be obtained at prices much under those asked by smelters. In April matters did not improve, the market still continued lifeless, and transactions were quite unimportant. The shipments from Chili were moderate, comprising only 805 tons for England and France; this, however, did not have the effect of causing any improvement in the market, which remained almost at a stand still. English tile was now sold at 77*l.*, and Chili bars at 71*l.* 10s. Some second-hand parcels of tough cake were now sold at from 76*l.* to 77*l.*, and best selected at 78*l.* to 79*l.*, Burra at 82*l.*, and Wallaroo at 80*l.* 10s. In May it became known that about 300 copper mines in Devon and Cornwall had stopped working, and that from 3000 to 4000 of the miners, all being able-bodied, and the most skilled and active of the mining population, with their wives and families, had emigrated; also, that the importations of copper ore were most likely to fall very considerably below the average. These circumstances had a tendency to strengthen the market, and, nothwithstanding the endeavours of some interested parties to run it down, and cause a depreciation in the value of the article, it was generally expected that a much better state of things would arise in the trade, and that more remunerative prices would be obtained. This improved condition of the market continued, and transactions began to take place at better prices. A parcel of tough ingots was sold at 80*l.* 10s., and foreign also advanced in price, and Burra was sold at from 84*l.* to 85*l.* Prices still continued slightly to advance, and tough cake was sold at 81*l.* Advices from Chili reported considerable shipments to this country, equal in all to about 700 tons of copper, which caused Chili slab to become rather easier, there being sellers at 73*l.*, while buyers offered 72*l.* 10s. In June, however, the market again relapsed into an inactive condition, and only a small amount of business was done, and intelligence arriving from Chili of large shipments to this country had the effect of causing the market to become somewhat depressed, and prices rather declined. Tough cake was now sold at 79*l.*, and about 300 tons Chili slab and bars were sold at Liverpool, the former at 70*l.* 10s., and the latter at 70*l.* Towards the latter part of the month, however, an improvement took place in the market, in consequence of the fortnightly shipments from Chili being only moderate, and prices became decidedly firmer, with a tendency to still further advance. In July, however, the market again relapsed into dulness and inactivity, and enquiries became exceedingly limited. Business was done in sheet at 80*l.*, and tough cake was quoted at 75*l.* to 77*l.* This unsatisfactory state of the market still continued, and sales of sheet and sheathing took place at 79*l.*, and tough ingot at 74*l.*; Wallaroo was sold at 83*l.*, and Chili bars at 68*l.* 5s. In August no better prospect seemed to open, and business continued to be done at low prices. Advices from Chili reported charters since the last shipments for 1800 tons, of which 1200 tons were in bars. This caused the quotation for Chili bars to drop at once to 68*l.* About the middle of the month, however, the market again became decidedly better, and business to a much greater extent was done, and altogether the general tone of the market became steadier. Transactions took place in tough cake at 77*l.* 10s., and in manufactured at 80*l.*, after which holders declined selling under 81*l.* This improved condition of the market still continued, and sales of tough cake were effected at 79*l.*, and manufactured at 81*l.* Wallaroo was quoted at 84*l.*, and Chili bars at 70*l.* 10s. As the month drew to a close this improvement did not pass away, but still continued to hold on, and great hopes were entertained that the cloud which had so long hung over the market had passed away, and that brighter prospects were in store. Business was now done in tough cake at 80*l.*, and afterwards at 81*l.* Wallaroo was firm at 84*l.*, and Chili bars advanced to 73*l.* 10s. Advices from Chili were received, stating that the shipments to this country in the fortnight amounted to 1330 tons. In September the market still remained steady, but there was not quite so large an amount of business done; prices, however, did not give way, and there was no disposition on the part of the holders to accept lower terms. The standard of ores at Swansea advanced 3*l.* 6s. The Chili mail brought advices that the shipments in the fortnight would be about 1300 tons. Towards the end of the month, however, the market again became weaker, and although there was no actual alteration in prices, yet they appeared less firm than they were, and there was every reason to expect that if business offered a concession in price would be obtained. In October the fortnightly shipments from Chili amounted to 2100 tons, of which 1750 tons were for this country, and the remainder were for the United States of America; after which considerable sales, amounting in all to about 900 tons Chili bars, were effected at Liverpool at 68*l.* to 68s. 5s. per ton. After this, however, a little better feeling sprung up, and prices again became a little firmer, and business was done in Chili bars in Liverpool at 69*l.* 10s. As the month advanced, however, the market again became quiet, and the advices from Chili announced shipments of ore and regulus equal to 1050 tons and of copper 350 tons, after which Chili bars were sold at 70*l.* The market now became depressed, and prices rather declined. Wallaroo was quoted at 82*l.* and Chili bars at 69*l.*, but actual business was not known to have taken place. In November the market continued dull, and the advices from Chili were not calculated to improve matters. Charters were reported in the fortnight to be equal to 3200 tons of copper for England and France, and this large quantity had the effect of further depressing the market, and causing the quotation for Chili bars to drop to 68*l.* Tough cake was now quoted at 76*l.*, and business was done in sheet and sheathing at 80*l.* Wallaroo was sold at 81*l.*, and Burra stood nominally at 84*l.* As the month advanced, however, the market became a little steadier: although the amount of business done was not great, prices became somewhat firmer, and there was less disposition on the part of sellers to accept such prices as were lately ruling. Chili bars advanced to 69*l.* This state of things continued without much alteration, and though no transactions of any moment occurred, prices did not at all decline. Rather considerable sales of Chili bars, however, took place, principally at 69*l.*, though some portion went at 69*l.* 10s. In December advices were received from Chili that the shipments to this country in the fortnight were 650 tons; but although this quantity was very small, yet the market did not improve, and no important transactions occurred, with the exception of Chili bars, of which considerable sales took place, part at 69*l.* 10s. and part at 70*l.* No activity whatever prevailed in the market; some sales of Wallaroo were effected, at 80*l.* to 80*l.* 10s.

IRON—STAFFORDSHIRE.—The adjourned meeting of the South Staffordshire and East Worcestershire Ironmasters was held at Birmingham on Jan. 3, when it was resolved—That the price of iron be reduced 20s. per ton, that puddlers' wages be reduced 1s. per ton, that millmen and others be reduced 10 per cent., that blast furnacemen and others be reduced 10 per cent., and that notice be given on the next Saturday. These resolutions had been practically arrived at in the previous week, but were not officially promulgated, because the date when notice should be given was not fixed, and it was thought unnecessary and unwise to state what had been determined until the masters were prepared to announce also when the resolutions would be put in practice. This reduction of prices and wages had long been inevitable, but was strenuously opposed by some of the influential houses, whose brands were well known, and who were able to do as much business as they desired. There seemed a probability of opposition to the reduction of wages on the part of some of the men, who stated that there was no cause for alarm as to the state of the trade and foreign competition, and they stated that the trade was on the point of revival, and, therefore, wages ought not to be reduced—a strike was expected to be the result of this determination. When this reduction in price was decided upon, it was hoped that more specifications would be forthcoming. The course that the men would adopt in consequence of the reduction in wages remained doubtful, but as they had for some time been getting only half wages in consequence of the scarcity of orders, it was thought hardly likely that they would enter upon a strike. Meetings of the workmen were held, and the puddlers at Brierley Hill determined to resist the reduction of wages; but, on the other hand, the millmen at West Bromwich resolved to submit conditionally, which showed that the men were divided among themselves, and that, probably, after all there would be no strike. When the notices of the reduction in wages expired, meetings of the men in various districts again took place to consider the course to be pursued, but nothing was finally decided; the impression, however, appeared to be that there would be no strike, and at length, very wisely, the men accepted the reduction, thus avoiding the injury that always follows a strike, and which invariably falls so heavily upon the men themselves. It is to be hoped that some day these strikes will be altogether avoided, and that some means will be adopted by which masters and men may be enabled materially to arrange any differences which may exist between them without having recourse to a strike on the one hand, or a lock-out on the other. And the revelations which have been made in the course of the year of the evils and horrors that so often arise from the Trades Unions will, we trust, be the means eventually of opening the eyes of the men, and causing them to see that it is for the benefit of interested parties alone that these things are done, and that the real good of the workmen is not thought of; and that, consequently, they not be led away, as they have been so often, by designing individuals, to do that which in the end is sure to return with tenfold mischief upon their own heads. In February the leading houses began to receive a few orders from large home buyers, and also from the East Indies, Brazil, and the United States, though they were far from sufficient to keep the works fully employed. An improvement in the demand, however, soon occurred, chiefly from the United States, where it was desired to secure as much iron as posssible, before the increased duties came into operation, in the hope that while paying the low rate of revenue they might extract the enhanced price the higher duties would occasion from their customers. Another hopeful feature was a renewed enquiry for plates for shipbuilding, the demand for which had been in abeyance some time. In March the news received from the United States led to the hope that the increased tariff would not be adopted, as the hostile influence of the measure had been the most discouraging feature in the prospects of the trade. In consequence of the orders which had been pressed for shipment to the United States in anticipation of the advance in the import duties being now completed, a slight lull took place in the market—short time became general, and competition for orders kept prices at a low point. Soon after, however, the announcement was received of the rejection of the American Tariff Bill, and it was hoped that activity would return and continue in the market. The stoppage about this time of so many ironshipbuilding yards brought down the demand for plates, so that there became a total absence of any animation in this branch of the trade. At the close of the month the Preliminary Meeting of the South Staffordshire Ironmasters was held at Birmingham, when a resolution was unanimously passed to adhere to the old scale of prices for all descriptions of manufactured iron; it was, however, doubtful whether many of those present were able to obtain the trade prices. In April the demand varied considerably, and very few orders were held in advance, so that some of the works were getting very short. The prices confirmed at the Ironmasters' Association could only be considered nominal, except in the case of a few leading firms. The continental demand now became checked in consequence of the uncertainty which the Luxemburg affair created, and owing to the pecuniary pressure on the railway companies, their orders were very limited. The apprehensions also entertained of unfavourable complications between France and Prussia, together with the doubtful aspect of political affairs at home, alike helped to depress the trade in its then sensitive condition; nevertheless, matters looked more cheerful than was anticipated. The quantity of finished iron sold was under the average certainly, but there was a steady trade doing, and producers seemed less anxious to press orders. The improvement in the demand from the East Indies now became a good feature in the trade, and the Australian and continental orders were increasing, while home buyers showed more disposition to come into the market. In May the works again became slack, but still there were more orders on hand than there had been for some time, and the trade was looking decidedly more healthy. The announcement at this time that the Luxemburg question was to be referred to a Conference caused more orders to be received from Germany and France; there was a steady continuance of moderate orders, which maintained the improvement experienced at the commencement of the quarter, with a manifest tendency to still further improvement. There was a decided increase in the orders for hoops, and the strikes in Pennsylvania and Ohio sent buyers here to a great extent. In consequence of this state of things, the works became in operation about three-fourths time; and there appeared more confidence in the future prospects of the trade. The Continental orders continued of moderate amount, while the demand from the United States improved.

The state of railway finance, however, operated to diminish the demand on that account, but, on the whole, the trade kept steady, though the orders were unequal to the capacity of the works. In June the home demand still continued low, but the East Indian demand was good, and a fair trade was doing with the Continent. From the United States orders were coming in, though not so extensively as was anticipated from the stoppage of the ironworks there through strikes. The failures which took place in the trade at this time exercised an

unfavourable influence, and caused a depression in the trade. The orders to hand in the case of the leading makers was about the same, and the withdrawal from competition of firms in necessitous circumstances was looked upon as likely to operate favourably upon the trade. At the close of the month the Preliminary Meeting of the South Staffordshire Ironmasters was held at Birmingham, when it was unanimously resolved to adhere to the old scale of prices for all descriptions of manufactured iron; these prices, however, could only be considered as nominal, as there was very little demand, and many orders were readily taken at much lower prices. The orders from the United States continued small, but a good trade was doing with the East Indies, and a few contracts were given out on Russian account, but from the rest of the Continent there was not much doing. In July it was considered that the general results of the quarterly meetings had been favourable, the accounts from all sources confirmed the belief that stocks were very low. Orders given out were wanted to be executed promptly, which proved that they had been delayed to the utmost point of time. The demand from the United States continued small, and it was feared that the artificially high prices which protective duties and an inconvertible currency occasion prevented capitalists from venturing into new enterprises, or incurring further obligations. Home merchants seemed more disposed to buy, and the demand from India still continued good. In August the trade appeared to be rather better, and though recent orders were not numerous, there was an improved prospect, in consequence of the large amount to be expended in Indian railways this year, and the expectation that the demand from that market would continue; also from the large sums voted for plating the fortifications with iron, which gave a stimulus to the trade. The home consumption, however, was quiet, and the requirements for machine purposes for the Lancashire cotton districts were considerably curtailed by the slackness which prevailed in that department of trade. Competition was keen for orders, and for all but best brands prices were low, and considerably further improvement was required before they would be moderately remunerative. A steady influx of orders for hoops and sheets now set in, a good business was also done in bars; and the works were going about three-quarter time on an average, while some of the leading makers were able to work nearly the whole week. At the close of the month the Preliminary Meeting of the South Staffordshire Ironmasters' Association was held at Birmingham, when, as anticipated, no alteration was made in prices. The demand continued pretty good, and it was generally agreed that the trade was better than for some months past. Local buyers who had been able to get the small makers to accept low rates now found this more difficult, as second-class makers were certainly not selling so low as they were. The orders from the United States also continued tolerably good. In October home merchants began to give out orders more freely, and the prospects for the future became more cheering. There was now no doubt that underselling on the part of the smaller makers of finished iron was very much diminished. The last of the Quarterly Meetings of the South Staffordshire Ironmasters was held at Wolverhampton, the attendance was very small, and scarcely any busines was transacted, and altogether it was one of the quietest quarterly meetings ever experienced. The fact was, everybody seemed disposed to abstain as much as possible from entering into engagements, and the more makers pressed sales, the less disposed were the buyers to operate; and in such circumstances nothing was to be done but to wait patiently until business came round in a natural way. About this time the East Indian Railway Company invited tenders for about 750 tons best Staffordshire iron. The trade was not very lively, but the demand to meet immediate wants was pretty good, and the works were doing not much less than three-fourths their ordinary full production. In November the demand continued rather quiet, and the orders received were of small amount. The United States were only taking small quantities, and but for the requirements of the East Indies trade would be dull. The East Indian Railway again invited tenders for 14,000 tons rails, and nearly 8000 tons of other iron, and the Midland and Great Northern advertised for their usual store for next year; these requirements, to a large extent maintained the trade, all accounts concurred in representing the absence of stocks everywhere. Trade now became quieter, and orders were of less amount, the only market taking an average quantity of iron being the East Indies, from whence the orders were of tolerable amount. The closing of many of the principal ports now made the trade quieter, as it invariably does at the end of the year. There were some hopes of a demand from the United States. There was a general impression that a reduction must be made in wages, but in the regular way this would only be decided at the end of the month. There appeared no doubt that the present was a very trying time for ironmasters of limited means, and the general feeling in the trade was an anxious one. In December there was no improvement in the demand, and it was generally expected that a reduction of wages must take place at the end of the quarter, unless an improvement should be experienced before that time. Several of the largest firms were only able to keep their works in partial operation. Prices were low, and very few makers were getting the rates fixed by the trade, but were selling at 1*l.* to 1*l.* 5s. lower. It seemed to be thought that the plan of fixing prices at the Quarterly Meeting, to which very few profess to adhere, but which regulate the rate of wages, is of very questionable advantage. The South Staffordshire ironmasters appeared disposed to let the other districts fight the battle with the men; but, if a reduction takes place elsewhere, they must either follow the example or lose the few orders coming.

Welsh.—At the commencement of the year the notices for a reduction in wages expired at some of the leading ironworks, but in each case the men expressed their willingness to go in at the reduced rate. This was generally expected, because the men themselves were fully aware of the serious difficulties which had been experienced by the masters during the past six or nine months. There were, however, strong hopes that as the year advanced a gradual improvement would take place, because it was well known that the requirements of many of the home and foreign railway companies, and other buyers, were large; and, as stocks were not large, a slight increase in the demand would be immediately felt in every branch of the trade. However, very little business was done, the fact being that there was a great want of confidence, and makers were extremely cautious in not entering into any speculative transactions. The prospect of business with the foreign markets was rather more encouraging, and it was expected that a fair share of such orders would be received. The ironmasters in Wales now waited to see the result of the reduction in wages in Staffordshire, and in the event of it proving successful would give the necessary notices at the end of the month. Towards the close of the month the trade continued dull, and the complete stoppage of enterprise by the effect last years' panic caused a serious decrease in the home demand, and consumers showed but little disposition to purchase, except to meet immediate requirements. American engagements were now the chief support of several of the leading works, and there were indications that the enquiry from that quarter was likely to increase. Large shipments of rails were made direct to the Southern States, instead of to New York, as was formerly the case; no steps had yet been taken by the ironmasters to reduce the wages, and it was hoped by the men that the requirements of buyers would so increase as to render it unnecessary to carry out the reduction. In February the trade was quiet, and some of the leading works were kept employed, by means of orders which had been received from abroad; a month's notice of reduction in wages was now posted at the principal ironworks, the same to terminate at the end of February; but it was not anticipated that the men would offer any opposition to the proposed reduction in wages. The advices from New York and most foreign markets continued to speak encouragingly of the future; soon, however, a slight improvement occurred, and a few orders for rails and miscellaneous descriptions of iron were placed on home account; and it was expected that now a movement for the better had taken place that it would be gradually increased. The export trade was tolerably good, and considerable quantities of railway iron were shipped for New York, New Orleans, and other American ports. The principal works now kept up operations tolerably well; but some of the makers found it difficult to keep the mills and furnaces going. The men employed at the leading ironworks, expressed their willingness to accept the proposed reduction, which would make the scale of payment 20 per cent. lower than it was eighteen months since. The advices from New York were favourable as to requirements, but much uncertainty existed as to the effect of the new Tariff Bill. The reduction in the rate of wages would enable the ironmasters to enter into transactions more freely, and negotiations were on foot respecting some good America orders, and an active enquiry was expected from that quarter, as buyers in the United States were anxious to be supplied with as large a quantity of iron as possible, before the restrictions of the new Tariff Bill come into operation. In March, the slight movement in the trade was fully maintained, and the enquiries received from foreign markets led to the hope that considerable orders would be placed during the spring months. Several cargoes were cleared out for the United States, and there were indications that home buyers, who had been withholding their specifications owing to the want of funds, would shortly be in a position to enter into transactions. The activity in the demand from the United States did not affect operations at the works, as the iron was principally in stock ready for shipment. The continental enquiry was slow, and buyers gave out but few fresh specifications; with the exception of the movement in the American demand, the trade remained dull. Home transactions showed no animation, although there was, perhaps, a slight addition to the engagements entered into. The announcement of the rejection of the American Tariff Bill was received with surprise, and it was hoped that the result would be the continuance of the activity which had prevailed during the last months. Towards the close of the month, however, there was no sign of substantial improvement, and quietness characterised the operations at the works. There were some orders for rails on the books, and this branch of the trade was the only one that had anything like life in it, but its continuance depended, in a great measure, on the American demand. The difficulties of the railway companies seriously affected the demand from home consumers, and prevented many specifications being given out. In April great quietness prevailed, and the confirmation of old list prices at the meeting of makers was generally looked forward to, although the list quotations were not obtained, except by a few leading houses. American engagements slackened a little, but not to any material extent, and the enquiries received from the United States led to the hope that during the coming months a very fair trade would be done with that quarter. East Indian orders now began to gradually to find their way; on home account, no material improvement was looked for until the embarrassments of the railway companies were surmounted. After the quarterly meetings were over, it was announced that very few additional engagements were entered into on the part of buyers, and there was still a large amount of caution evinced in giving out contracts; on the whole, however, the tendency of the trade was to improvement, and with a slight addition to the demand there would be a tangible increase in employment at the works. Home business remained comparatively quiet, but still there was a decidedly better feeling evinced. As was expected, the enquiry for rails on American account was not quite so good as it had been, still there was no decided falling off, and the exports for the month reached a respectable amount. Only a small business was done with South America, but East Indian engagements were offered with greater freedom, and there was a better demand from that quarter. The home demand increased a little, and the transactions of buyers were in some cases larger than they had been; and there were expectations that home railway companies would be in the market before long. In May there was little doing at the works. The American orders also decreased, but the advices from New York were more encouraging for future requirements. The continental demand was checked by the rumours of war between France and Prussia, which, should it occur, would be sure to affect the trade. An improved feeling as regards Eastern transactions was maintained, and there was a probability that additional contracts would be forthcoming from that quarter ere long. After the continental affairs, however, assumed a more peaceful character, a more favourable tone was evinced. The plate mills now became rather better employed, iron shipbuilders giving out a few more specifications. This improved feeling continued. The exports to the United States were large, and Russia also took considerable quantities; British America, also, was now a tolerable customer. The home trade, however, still continued dull, and the railway companies were still small buyers. As customers now began to show more readiness to enter into business, it was expected that a reaction would soon take place in prices. Unfortunately, however, some failures which occurred at this time in the iron trade had the effect of checking the slight improvement which had set in, although the check was expected to be only temporary. The expected falling off in the American demand, in consequence of the abandonment of the Tariff Bill, did not take place, and a very fair amount of business was still done with the United States. The home trade, however, showed no animation, and the railway companies were still virtually out of the market. In June very little change took place. Buyers in some instances were more disposed to enter into fresh engagements for railway iron, but the prices offered were scarcely any advance on the quotations at the commencement of the year; still, there was a better feeling, upon the whole, which it was hoped would be followed by a substantial degree of improvement. There was a renewal of enquiries on Eastern account, and the American shipments were considerable. Home business, however, showed continued dulness, which was only relieved by an occasional contract. About this time the ironmasters began to express more confidence in the future. Eastern orders began now to make their appearance with greater regularity, and considerable purchases of rails were made by Russian and American houses. The make of rails at the principal works was now somewhat larger than it was, and the advices received from several of the foreign markets led to the hope that the demand in this branch of the trade would be likely to increase, and on home account, also, there was a prospect of a better enquiry for railway iron. In July, although there were still marks of quietude, yet the prospects were decidedly better, and the opinion prevailed that a general though gradual improvement would soon take place, and this belief was strengthened by the fact that home consumers' stocks had become so low that they were compelled to come into the market, and could not avoid doing some business, although it was not to any great extent. Enquiries from the United States were increasing, and the demand from the East Indies continued. On home account, actual business remained small, but buyers' requirements were such that they could not fail eventually to send more orders. In August the slight movement in the trade was so far maintained, and stocks at several of the establishments were lower than they were a month before. In home business, makers were principally looking forward for improvement. Rumours were now current that very large orders for rails were about to be given out in Belgium, and in such event the competition of makers of that country in other markets would be withdrawn for a considerable time, which would, of course, act in a beneficial manner to the trade here. Exports to America continued about the same, and a considerable quantity of iron was being shipped to Russia, from which place advices were favourable. Foreign buyers were now making more enquiries than usual, and there was great hope that the requirements of India, America, and the Continent would gradually increase. The exports continued principally to Russia, the United States, and India, and there were also some Dutch contracts executed. Home business did not move to the extent anticipated, and the slow progress made by the railway companies in arranging their financial difficulties materially interfered with the giving out of fresh orders. Foreign advices were a little more satisfactory, and buyers showed less reluctance in entering into fresh transactions. Russia and the United States were the best markets, the exports to the former in the previous month reaching 4800 tons, and to the latter 2200 tons. In September the shipments kept up tolerably well, and the somewhat improved condition of the trade was maintained, and there seemed every prospect of its continuance. The home railway companies had not yet commenced buying rails to any extent, but the shipment of railway iron for foreign markets went on pretty steadily, and business became more animated than it had been for some weeks previous. The enquiries from abroad fully supported the expectations already formed, that requirements were large, and that sooner or later orders would have to be given out. Home transactions continued to be confined to actual necessities, buyers, as a rule, avoiding anything like purchases on speculation. The Russian and American contracts now in course of execution were taking a considerable quantity of iron, and business generally assumed a more hopeful tone. Prices, however, did not respond to the improvement which had set in, and consequently the trade could not be said to be in a satisfactory state. The total quantity cleared out on Russian account during the previous months was 12,073 tons, and from the United Statrs 4608 tons, the whole being railway iron. Strong hopes were entertained that home buyers, more especially the railway companies, would be considerable purchasers at the commencement of the quarter. There was still considerable animation in the shipments to the United States, and business with that country seemed to have revived. In October additional engagements for railway iron were looked forward to from India, where the railway system had proved a decided success. At the various works the trade had not improved to the extent anticipated, but the depression had been so long and so severe that anything like a restoration to its previous activity could not be expected. On American account a considerable quantity of iron was being still shipped, and it was anticipated that for some time to come these shipments would continue to increase. Home consumers now began to enter the market more freely, and although as yet they were only small purchasers, yet there was good ground to believe that before the close of the year business would be done on a larger scale. During the previous month the exports to the United States reached 17,878 tons. The Russian trade was now fast drawing to a close, but it was expected that next spring there would again be large shipments to that country. On continental account the enquiry was rather slow, and buyers were particularly cautious in entering into new engagements. In the month of November the Russian contracts which had to be completed this season kept two or three establishments rather fully employed, but from the end of this month until the commencement of next spring the works would have to depend mainly on other markets. To the United States several cargoes were shipped, but there was some uncertainty as to the future requirements of that country. The continental enquiry was checked by political matters, and the uneasy feeling as to the preservation of peace. Several of the home railway companies now commenced making small purchases, and as the total mileage requiring relaying was large, it was evident that they must even be larger buyers. In consequence of rumours of war on the Continent, our trade was kept quiet, and much depended upon the preservation of peace; but as this was likely to be the case, hopes were entertained that the trade would revive. It was now admitted that the trade had not made the progress that was expected at the commencement of the quarter, and some were of opinion that rather a hard winter would have to be passed through. Advices from the United States of America continued favourable. Home engagements were still remarkably small, and it was evident that consumers were curtailing operations to a somewhat considerable extent. The closing of the Russian trade for the season undoubtedly checked operations at several of the principal establishments, for while shipments to that country were continued makers had some degree of confidence in being enabled to keep their mills and forges going. Towards the close of the month the reports from the works were not favourable, and business was generally in an unsatisfactory state. The slight improvement in the trade at the commencement of the quarter had now passed away, and an unfavourable view was taken of the winter. Cargoes were still leaving for the United States, and the enquiries from that country were about the same. Some engagements were entered into by continental houses. There was as yet no active movement taken in reference to wages, but there was little doubt that the example of the North of England makers would be followed, unless an improvement took place. In December the trade showed no evidence of increased vitality. The United States were not buyers to the extent anticipated. The commencement of the new year was now anxiously looked forward to by the ironmasters, as it was thought that a change for the better was sure to take place. In the midst of the dulness there was one feature which indicated that when an an improvement commences it will be a rapid one, and this was the fact that both home and foreign buyers—more especially the former—have no stocks whatever. The exports during the last month reached 5953 tons. The enquiry from the United States was not so good as expected. There now seemed every probability that the proposed reduction in wages would be carried out without opposition, as the necessity of such a step was generally admitted.

Swedish.—At the commencement of the year the demand was slack, but early in January there was rather more activity, and several transactions occurred, and this continued throughout the month. In the following month also a very fair business was done, and prices were well maintained. In March the enquiry still existing, prices became rather firmer; but in the following month the demand became more moderate, until towards the close of the month, when the demand again became active, and a considerable amount of business was done. In May also the demand increased, and an unusual amount of business was done, and this state of things continued until the middle of June, when the demand slackened. In July the demand again became active, and a very good amount of business was again done. Throughout the next month also a very fair business was still done; but in September the demand again slackened, and became only moderate, and at the close of the month had almost ceased. In October there was not much activity, and holders were somewhat disposed to meet buyers as to prices; but towards the middle of the month, though the demand was not quite so active, yet importers were firm in their prices, and were not disposed to make any concessions. Towards the close of the month, however, a very extensive business was done, and several large parcels were sold, both here and for arrival; holders, however, were obliged to give way a little in price, in order to effect sales. In November a good business was still done, and parcels in course of arrival were freely sold; but as the month advanced the demand slackened, and there was no great amount of activity in the market. Considerable quantities now arrived, but as the season was now drawing to a close, prices were well maintained. In December there was still a fair demand, and prices were well maintained, but towards the close of the month the demand became less active.

Scotch Pig-Iron.—At the beginning of the year business was not very active, and the price was 54s. 6d. cash, which afterwards advanced to 54s. 9d. cash, and then, after some varied fluctuations, again returned to 54s. 6d. cash. The amount of business being still small, the price declined first to 54s. 3d. cash, and afterwards to 53s. 9d. cash. In February the market still continued heavy, and comparatively little was done, the price continuing at 53s. 9d. cash, after trifling variations. The amount of business still continuing limited, the price dropped to 53s. 6d. cash; but in March, though very little business was doing for speculation, a fair amount took place for shipment and consumption, and the price went up to 54s. cash, but afterwards fell to 53s. 10d. cash; and the market remaining without animation, further declined to 53s. cash. Towards the close of the month the market became more than usually depressed, and the anxiety to sell at one time amounted almost to a panic, and the price dropped to 51s. 6d. cash; it afterwards, however, rather improved, and the price went up to 51s. 9d. cash, but again declined to 51s. 7½d. cash, and then again improved to 51s. 10½d. cash. In April the disquieting rumours on the Continent affected the market, but though business was only moderate, prices were not much altered, and stood at 52s. cash. Business was now on a very limited scale, and no alteration took place in the price. In May the market assumed a more cheerful appearance, and a fair amount of business was done at 52s. cash. The steady diminution of the stocks appeared now to attract the attention of operators, and the consequence was that the market showed an upward tendency, and a more extensive business was done than had been the case for some time past, the price being 53s. cash; this state of things continued, and the price rose to 53s. 9d. cash, but afterwards declined to 53s. 7½d. cash, and then to 53s. 6d. cash. In June a slight improvement occurred, and business was done at 53s. 9d. cash, but afterwards the market became quiet, and the price fell to 53s. 3d. cash; again an improvement took place, and the price advanced to 53s. 9d. cash; but towards the close of the month the market again became dull, and the price fell to 52s. 9d. cash. In July the market became rather better, and the price rose to 53s. cash, but afterwards became very inanimate, and the price dropped to 52s. 6d. cash. In August a fair amount of business was done, and the price improved to 52s. 9d. cash, and afterwards to 53s. cash, and then to 53s. 3d. cash. Towards the close of the month an extensive business was done in warrants, and the price gradually advanced to 54s. cash. In September the market continued active, and a large business was done at 54s. 6d. cash, which, however, afterwards fell to s. 4½d. cash; and as the market became afterwards less active, further declined to 53s. 10½d. cash. Soon, however, a better business was again done, and the price went up to 54s. 3d. cash. In October the market was quiet, and only a moderate business was done, and the price declined to 54s. cash; but afterwards an improvement occurred, and the price rose to 54s. 7d. cash. Again more animation arose in the market, and an extensive business was done, the price gradually advancing to 53s. 3d. cash, and afterwards to 55s. 4½d. cash. In November a moderate business was done at 55s. 3d. cash, but afterwards buyers became extremely shy, and the price dropped to 54s. 9d. cash, and then as the market did not improve, to 54s. 3d. cash. The market still continuing dull, the price further dropped to 53s. 6d. cash, and afterwards to 53s. 4½d. cash. In December only a restricted business was done, but the price rose again to 53s. 6d. cash; the market afterwards became depressed, and the price fell to 52s. 9d. cash, but afterwards slightly rallied to 53s. cash.

Lead.—In January a moderate business was doing, and prices were firm, which continued throughout the month. In February the market remained without any important change, the amount of business transacted still being only moderate. Towards the close of the month quotations became 19*l.* 10s. for common English pig, 19*l.* 15s. for LB, and 22*l.* 5s. for WB. A fair enquiry now arose, and prices were well maintained. In March the market became rather dull, but no change occurred in prices. In April there was an animation in the market, and transactions were only limited. Spanish pig was a trifle firmer, the quotation being 19*l.* 2s. 6d.; as the month advanced, however, the market became decidedly firmer, and prices slightly advanced. In May a fair business was still doing, and prices continued firm. Spanish pig advanced to 19*l.* 10s., 19*l.* 15s. This improved condition of the market remained throughout the month; but in June the demand declined, and prices were not so firm, although no actual alteration took place until the close of the month, when some transactions took place under former quotations. In July business was by no means active, and sellers were not unprepared to make slight concessions in price to meet buyers' limits. In August, however, the demand became more steady, and prices generally were well maintained. In September the demand again became only moderate, but no change occurred in prices, which still remained tolerably firm. In October business was not active, but prices remained without any material alteration. In November, however, as the market continued inactive, prices became easier, and common English pig was quoted at 19*l.* 7s. 6d., and LB at 19*l.* 15s.; but soon after, as business did not improve, common English pig fell to 19*l.* 5s., 19*l.* 10s., and towards the close of the month to 19*l.*, 19*l.* 5s. In December only a limited business was done, and prices became easier. Common English pig fell to 19*l.*, 19*l.* 2s. 6d. LB, to 19*l.* 10s., and Spanish pig to 18*l.* 10s., 18*l.* 15s.

Tin.—At the commencement of the year the market for foreign showed a decided tendency to advance; the demand was active, and a considerable business was done in Straits at 85*l.* cash, and 85*l.* 5s. prompt one month. In English one of the smelters raised the price 2*l.* per ton, making the price 87*l.* for blocks, 88*l.* for bars, and 90*l.* for refined; and although the others made no official advance, they would not sell under these prices. In Holland the stock of Banca on Dec. 31 was 131,109 slabs, against 96,859 slabs same time last year; and the arrivals towards next sale were 64,531 slabs, against 93,770 slabs same time last year. Straits still continued to advance, and business was done at 86*l.* 10s. cash, 86*l.* 15s. one month, and 87*l.* three months prompt. On the 11th inst. another advance in English was announced by the smelters of 3*l.* per ton, making present prices 90*l.* for blocks, 91*l.* for bars, and 93*l.* for refined. Banca was held for 89*l.* In February the market was not quite so active, and business in Straits was done at 86*l.* cash. In Holland the stock of Banca on Jan. 31 was 120,209 slabs, against 84,909 slabs same time last year, and the arrivals to the next sale were 72,300 slabs, against 126,933 slabs same time last year. The market for English was dull, at the official quotations. The market remaining without animation, the price of Straits declined to 85*l.*, 86*l.*, at which price a limited business done. The stock in warehouse in London on Jan. 31 was 3168 tons, against 3355 tons same time last year, and the quantity of Straits afloat for Europe was 648 tons, against 1378 tons same last year. The market still drooping, business in Straits was done at 85*l.* cash, and Banca at 88*l.*; and in English little business was doing. In March the market for Straits did not improve, and transactions occurred at 84*l.* 10s. cash. In Holland the stock of Banca on Feb. 28 was 113,966 slabs, against 76,950 slabs same time last year; and the arrivals towards the next sale were 85,765 slabs, against 144,948 slabs same time last year. In consequence of the announcement that the half-yearly sale of Banca in Holland, to take place on the 28th inst., would be so much smaller than usual, a considerable amount of excitement took place in the market, and an advance occurred in prices. Business to some extent was done in Straits, first at 85*l.* cash, then at 86*l.* 10s. cash, and afterwards at 87*l.* cash, while for arrival transactions occurred at 88*l.* Banca was sold at 90*l.*, and afterwards at 93*l.* The stock in warehouse in London on Feb. 28 was 3048 tons, against 3091 tons same time last year, and the quantity afloat for Europe was 900 tons, against 1187 tons same time last year. This state of things continuing, Straits rose to 88*l.* cash, then to 88*l.* 10s. cash, and afterwards to 89*l.* cash, and for arrival 89*l.* 10s. to 90*l.* Transactions in Banca took place at 93*l.* 10s. English also was not obtainable under the official quotations, and on the 19th inst. the smelters announced an advance of 2*l.* per ton, making prices 92*l.* for blocks, 93*l.* for bars, and 95*l.* for refined. On the 28th inst. the Dutch Trading Company's sale of Banca in Holland took place at Amsterdam, when 69,400 slabs Banca and 600 slabs Billiton were sold at 54 fls., equal to about 94*l.* 10s. delivered here. In April Straits was still quoted 88*l.* to 89*l.* cash, and 1000 slabs Banca were sold at sale rates, and 600 slabs on the spot at 94*l.* In Holland the stock of Banca on March 30 was 176,924 slabs, against 171,460 slabs same time last year, and the arrivals towards next sale were 23,355, against 44,744 same time last year. The market now became inactive, and transactions in foreign unfrequent. Straits was sold at 88*l.*, but afterwards there were sellers at 87*l.* 10s. and 87*l.* cash, but without finding buyers, and the price afterwards fell to 85*l.* 10s. and 85*l.* cash. On the 15th instant the smelters of English announced a reduction of 3*l.* per ton, making prices 89*l.* for blocks, 90*l.* for bars, and 92*l.* for refined, but this reduction had no effect in causing any improvement in the market. Holders of Straits were quite disposed to accept 85*l.* 10s., or even 85*l.* cash, if buyers could be found. Towards the close of the month the market for Straits continued its downward tendency, and a few transactions occurred at 84*l.* cash. The quotation for Banca was 88*l.* to 90*l.* In May a slight improvement occurred in the market for foreign, and Straits was sold at 84*l.* 10s. cash. In Holland the stock of Banca on April 30 was 164,356 slabs, against 147,268 slabs same time last year, and the arrivals towards next sale were 35,948 slabs, against 69,840 slabs same time last year. This improvement continued, and Straits rose to 85*l.* cash, while holders were indisposed to sell, looking for better prices. Soon Straits again advanced, and business was done at 85*l.* 10s. cash and 86*l.* for arrival. In the month of June a considerable amount of business was done in Straits at advanced prices, closing at 86*l.* cash and 88*l.* for the arrival. In Holland the stock of Banca on May 31 was 154,472 slabs, against 124,529 slabs same time last year, and the arrivals towards next sale were 46,114 slabs, against 88,857 slabs same time last year. This improvement continued, and Straits was sold at 86*l.* 10s. cash, and 88*l.* for arrival, and Banca at 92*l.* The enquiry still remained good. English was steady at smelters' quotations; and on July 3 an advance of 2*l.* per ton was announced, making prices 91*l.* for blocks, 92*l.* for bars, and 94*l.* for refined. Business in Straits was done at 87*l.* cash, and afterwards at 87*l.* 10s. cash. Towards the close of the month, however, the market became rather easier, and Straits was sold at 87*l.* cash, Banca being quoted at 91*l.* In August the market for Straits became rather weaker, and business was done at 86*l.* 10s. cash. In Holland the stock of Banca, on July 31, was 138,505 slabs, against 109,375 slabs same time last year, and the arrivals towards next sale were 58,369 slabs, against 118,159 slabs same time last year. The market for Straits became still weaker, and parcels were sold at 86*l.* cash. The stock of tin in warehouse in London, on July 31, was 2058 tons, against 2633 tons same time last year; and the quantity of Straits afloat for Europe was 2043 tons, against 1416 tons last year. Towards the close of the month, however, a considerable improvement occurred, and a large business was done in Straits at advanced prices—first at 86*l.* 10s., then at 87*l.*, and afterwards at 87*l.* 10s. cash, and 88*l.* for arrival. On Aug. 29 the smelters of English announced an advance of 2*l.* per ton, making prices 93*l.* for blocks, 94*l.* for bars, and 96*l.* for refined. The market for foreign also continued its upward course, and business in Straits was done at 88*l.* 10s. cash, up to 90*l.* 10s. cash, and 91*l.* for arrival. In September the market for Straits was at first not so firm, and business was done at 88*l.* 10s. cash, but afterwards improved to 89*l.* cash, and 90*l.* for arrival, at which considerable business was done. English was firm at the official rates. In Holland the stock of Banca, on Aug. 31, was 126,606 slabs, against 97,850 slabs same time last year, and the arrivals towards next sale were 64,416 slabs, against 168,507 slabs same time last year. The stock of tin in warehouse in London, on Aug. 31, was 2995 tons, against 2762 tons same time last year, and the quantity of Straits afloat for Europe was 1592 tons, against 1275 tons same time last year. The position of the market for Straits still improved, and transactions took place at 90*l.* cash, and 91*l.* for arrival. The demand for English was fair at the official quotations. On the 24th inst. the smelters of English announced an advance of 3*l.* per ton, making prices 96*l.* for blocks, 97*l.* for bars, and 99*l.* refined. On the 26th inst. the Dutch Trading Company's half-yearly sale of Banca took place at Rotterdam, when the whole quantity offered was sold at 54½ fls., equal to about 94*l.* 10s. delivered here. As this price did not come up to the anticipations, the price of Straits became unfavourably affected; and although previously to the sale business had been done at 92*l.* cash, yet afterwards transactions in Straits took place at 90*l.* 10s. to 90*l.* cash. In October the market for English was quiet, and but a small amount of business was done. For Straits also there was less activity, and prices gave way, and business was done at 90*l.* cash, and afterwards at 89*l.* 10s. cash. In Holland the stock of Banca on Sept. 30 was 187,551 slabs, against 199,259 slabs same time last year; and the arrivals towards next sale were 1654 slabs, against 34,554 slabs same time last year. Straits still continued flat, and business was done at 89*l.* cash, but afterwards became a little steadier, and business was again done at 90*l.* cash and 91*l.* for arrival, holders still looking for better prices. English was firm at smelters' prices. In November, although transactions in Straits were by no means extensive, the price remained firm, at 90*l.* cash. In Holland the stock of Banca on Oct. 31 was 172,601 slabs, against 166,796 slabs same time last year, and the arrivals towards next sale were 18,978 slabs, against 50,92[illegible] slabs same time last year. The market for English was quiet, and business was done at about 1*l.* under the official rates. Straits continued to be sold at 90*l.* cash. The stock of tin in London on Oct. 31 was 2165 tons, against 3185 tons same time last year. As the month advanced Straits became less firm, and transactions occurred at 89*l.* 10s., but towards the close of the month became again a little firmer, and business was done at 90*l.* cash. In December no alteration occurred in foreign, and only a limited business was done. In Holland the stock of Banca on Nov. 30 was 158,909 slabs, against 140,109 slabs same time last year, and the arrivals towards next sale were 23,976 slabs, against 60,624 slabs same time last year. The market for Straits now became less firm, and business was done at 89*l.* 10s. cash, and towards the close of the month further declined to 87*l.* cash and 87*l.* 10s. for arrival. English also became dull, and business was done at about 3*l.* under official rates.

Spelter.—At the opening of the year the market for this metal was not very firm, and business on the spot was done at 21*l.* 17s. 6d., but an improvement now occurred, and the price rose to 22*l.*, and afterwards to 22*l.* 5s. The stock in London on Dec. 31 was 4266 tons. The price did not, however, last long at 22*l.* 5s., but dropped again to 21*l.* 17s. 6d., but again rose, and business took place at 22*l.* In February there was little activity in the market, but the price on the spot remained at 22*l.* The stock in London on Jan. 31 was 4456 tons, being an increase

of 190 tons during the month. Ere long the market became a little depressed, and transactions occurred at 21*l.* 5*s.* on the spot, and afterwards still further declined to 21*l.* In the month of March the market became decidedly firmer, and business occurred on the spot at 21*l.* 12*s.* 6*d.* The stock in London on March 1 was 4121 tons, being a decrease of 145 tons during the month. The market began now to improve, and business was done on the spot at 21*l.* 15*s.* During the remainder of the month, however, the market remained inactive, but no change occurred in the price. In April, though the demand was not active, holders were firm at 21*l.* 15*s.* on the spot. The stock in London on March 30 was 3421 tons, being a decrease of 700 tons during the month, but with the expectation of spring arrivals the market became dull, and the price on the spot fell to 21*l.* Towards the close of the month a slight improvement occurred, and the price on the spot advanced to 21*l.* 10*s.* In May business was not quite so good, and transactions on the spot occurred at 21*l.* 5*s.* The stock in London on April 30 was 3678 tons, being an increase of 257 tons during the month. The price afterwards declined to 21*l.*, the demand being only limited, but soon again advanced to 21*l.* 5*s.*, at which it remained till the end of the month, when business was again done at 21*l.* on the spot. In June the market was very quiet, and parcels on the spot were sold at 20*l.* 17*s.* 6*d.*, but afterwards again rose to 21*l.* The stock in London on May 31 was 3296 tons, being a decline of 382 tons during the month; throughout the month the price on the spot remained at 21*l.*, though little business was done, but towards the end of the month the price on the spot fell to 20*l.* 12*s.* 6*d.*, but afterwards rallied to 20*l.* 15*s.* In July the price at first declined to 20*l.* 12*s.* 6*d.*, but afterwards improved to 20*l.* 17*s.* 6*d.*, and then again to 21*l.*, at which it remained throughout the month, no great amount of business being done. In August the price on the spot still remained at 21*l.* The stock in London on the 1st inst. was 3627 tons, being a decrease of 256 tons during the month, but the demand still continuing very limited the price dropped to 20*l.* 15*s.*, the market remaining unusually quiet, and no important transactions occurred. Towards the close of the month, however, a little better feeling occurred, and the price went up from 20*l.* 17*s.* 6*d.* to 21*l.* In September very little business was doing, but the price remained at 21*l.*, under which holders were not disposed to sell. The stock in London on August 31 was 3763 tons, being an increase of 136 tons during the month. The market began now slightly to advance, and business on the spot was done at 21*l.* 5*s.*, and afterwards at 21*l.* 7*s.* 6*d.*, and towards the close of the month there was much more activity exhibited in the market, and parcels on the spot sold at 21*l.* 10*s.*, and afterwards at 21*l.* 15*s.* In October the market again became inactive, but the price remained at 21*l.* 10*s.* The stock in London on Sept. 30 was 3681 tons, being a decrease of 82 tons during the month. A much more extensive business was now done, but no advance in price occurred, but afterwards, as an improved business continued to be done, the price went up to 21*l.* 12*s.* 6*d.* on the spot. In November the market continued to improve, and business was done on the spot at 21*l.* 15*s.* The stock in London on Oct. 31 was 3053 tons, being a decline of 628 tons during the month; the market then continued to improve, and the price on the spot advanced to 21*l.* 17*s.* 6*d.* The market, however, afterwards became quiet, and the price on the spot dropped to 21*l.* 15*s.*, but as no important transactions occurred, the market being very inactive, a further decline occurred to 21*l.* 5*s.* In December the market continued inactive, the price on the spot remaining at 21*l.* 5*s.* The stock in the port of London on Nov. 30 was 2739 tons, being a decrease of 314 tons during the month. The price on the spot continued to decline, first to 21*l.*, and then eventually to 20*l.* 12*s.* 6*d.*, and afterwards to 20*l.* 7*s.* 6*d.*

TIN-PLATES.—In January the demand was only moderate, and prices tended rather in favour of buyers; but makers at the Quarterly Meeting adopted the old prices, in anticipation of a better demand arising. In February a rather improved demand existed, and prices became steadier. The works now became fairly employed, and for charcoal there was a good demand. In March the demand continued moderately good, stocks were light, and orders kept pace with the make of the works, and it was anticipated that should the advance in the price of tin be maintained there was a probability of better prices occurring. In April there was a tolerably good demand, and the works were in pretty regular employ; still the prices fixed at the Quarterly Meeting were not obtained, although there was a nearer approach to them than there had been for some time past. In May little alteration occurred, and as many new works had started the supply was likely to continue fully equal to the requirements of buyers. Orders now became less numerous, as the export enquiry fell off, and, consequently, prices were not well maintained. In June, as export houses were purchasing only sparingly, quotations were somewhat easier; but, as there were no stocks on hand, any improvement would be soon felt. Throughout the month, however, the demand was very limited, and the trade remained quiet. In July a rather better enquiry existed, and prices became firmer, and the works were generally in fair working. Precisely the same state of things continued during the next month. In September a great deal of animation was evinced in the trade, and both charcoal and coke were in good demand. In October the stocks in the hands of manufacturers were very low, but the orders on the books continued good, and the works were generally well employed, and the resolution of makers to adhere to last quarter's quotations gave general satisfaction. In November, however, the trade became rather slacker, but makers were not disposed to give way in prices, but ere long prices became easier, and coke could be obtained at 22*s.* 6*d.* per box. In December no improvement occurred, owing to the absence of orders from America.

STEEL.—Occasionally during the year a good business has been done in foreign, but generally the demand has not been very active, and only occasionally has there been any stock here.

QUICKSILVER throughout the year has been in only moderate request, and no very extensive transactions have occurred. The price has not at all varied during the year.

SCOTCH PIG-IRON TRADE FOR 1867.

We take the following statistics from the Annual Circular of Mr. THOMAS THORBURN, metal merchant, of Glasgow :—

Dec. 26.—After a cycle of six prosperous years, we have had one year without buoyancy in the Iron Trade. When we reflect on the high price of corn, arising from a deficient harvest over a great portion of the world, and the disorganised state of the Cotton Trade—the most important branch of enterprise in the United Kingdom—the cause of the present depression in iron is sufficiently explained. According to the Ironmasters' Returns, the quantity of pig-iron produced in 1867 is 1,031,000 tons, showing an increase of 37,000 tons, when compared with last year. The deliveries by railways, the shipments (foreign and coastwise), combined with the local consumption, are 1,068,000 tons, and show a falling off, when compared with the preceding year, of 68,000 tons. The stock of pig-iron in Scotland is 473,000 tons, thus exhibiting a decrease of 37,000 tons, as compared with 1866. During the year the price has fluctuated from 51*s.* 6*d.* —the lowest point to which it fell in July—to 55*s.* 6*d.*, the highest attained in October—giving an average for the year of 53*s.* 6*d.* per ton. The malleable ironworks, the foundries, and shipbuilding yards, have felt increasing languor. Next year will surely manifest a healthier condition in the cotton trade, and we may reasonably expect a lower range of prices for grain. Should these anticipations be realised, there is no doubt the Iron Trade will show an improvement.

Royal School of Mines, Jermyn-Street.

MR. WARINGTON SMYTH'S LECTURES.

[FROM NOTES BY OUR REPORTER.]

LECTURE XIV.—Mr. SMYTH began by remarking that in his last lecture he had described briefly the method of constructing bore-holes of moderate diameters, and of no considerable depths, for exploratory purposes, and also for supplying water to towns. Even under these circumstances the delays, difficulties, and expenses connected with boring were so considerable as to tax the ingenuity and perseverance of those engaged in the work in a very high degree. The great source of difficulty arose, however, from the fracture of the rods, and leaving a portion of it at the bore-hole, a catastrophe which sometimes required the labour of months to overcome. When one of these fractures took place it was necessary to ascertain with exactness the place and position in which the piece at the bottom was left, whether the fracture took place at a screw joint, or in the spaces between those joints. A variety of implements were used for this purpose. If the fractured end of the piece were jammed against the side, it was obvious that if an attempt were made to raise the fragment from a lower position, the more force used the more inextricably fast would it be rendered. This difficulty was, however, got over by the use of iron fingers, which, grasping the stem below the fracture, clasped it, as it were, by a hand, and it was then easily drawn to the surface. Fractures, however, frequently occurred which defied all manipulation of this kind; and, perhaps, after much time had been spent in vain attempts to sieze the broken end, it would have to be broken in small pieces by strong steel cutters. The lecturer exhibited a great variety of implements from the Museum used for the recovery of broken boring tools. He next, at great length, and by means of models and drawings, depicted and explained the now well-known boring apparatus of Laurant and Deguser, of Kind, and of Dru and Mulot. In Dru and Mulot's plan, which was, to some extent, a modification of that of Kind, a strong lever was employed, attached to the piston-rod of a steam-engine. The great depth to which bore-holes were now sunk rendered the weight of the rods a very important consideration. That weight, as they would recollect, increased in a regular ratio with the depth, so that by the time they had got down to 2000 fathoms the weight to be overcome was enormous. But more than this, the stroke of the cutting tool at the bottom produced such a vibration as to be extremely prejudicial to the rods, loosening the joints, invading the sides of the bore-hole, and, perhaps, breaking the rod itself. Thus, if working with a chisel-shaped tool a piece of stone higher up in the bore-hole became detached by the vibration, it would fall on the top of the cutting-tool, and so wedge it in as to make the application of extreme force a necessity. This was no unfrequent circumstance, and rods were fractured, and serious difficulties and delays arose from it. The great question how these difficulties and dangers were to be avoided had long engaged the attention of the bore-masters. Many schemes had been tried, and, although much had been done to mitigate these evils, they were yet far from being wholly overcome. In the improved apparatus, which he had described, it was attempted to lessen the specific gravity by making the rods of wood, with iron connections, and tapering the wood towards each end. One of the most successful systems was that of a Prussian officer, named Œynhausen, by which the tubular principle had been introduced, and found to be productive of many advantages. Wooden rods attached by iron screws, however, seemed to be most in use, and had been employed with great success in the United States. For instance, the deep bore-hole at Louisville had been carried to a depth of 2086 ft. in 16 months, an extremely short time for a great operation of this kind. Shorter bore-holes, however, were put down by hundreds in various parts of America by extremely simple means, in order to tap the petroleum springs. In cases where the boring was through watery ground, and the hole was full of water, it was found that the specific gravity of the rods being thus lightened the vibration was less, and that they were not subject to the same amount of destructive action. Vibration, however, remained a great inconvenience still. A further improvement, and one of great importance, was first suggested by Kind—namely, to make the lower portion of the rod to fall with the tool, independent of the rest. Supposing the cutting-tool were raised 1 ft., or more, and then let fall, full advantage would be had of the weight of the tool, multiplied by the distance it had fallen; but, if 1000 ft. of rod were attached to it, the weight to be raised after each stroke would bear no proportion to the effect produced. What was, therefore, called a free falling tool was a desideratum long desired. One of the first inventions in this direction was made by a Prussian officer of engineers, and was exhibited at the Exhibition of 1862. The tool, in this case, was enclosed in a cylinder of a length equal to the fall it was desired to have. At the end of the rod, which was made to pass through the cylinder until it reached the head of the cutter, was a catch, which, by a simple contrivance, caught a projection, and drew up the rod with it. On reaching the top of the cylinder a smart concussion dislodged the tool, which fell free to the bottom of the hole. This system was modified by M. Kind, under whose arrangement the head of the tool was seized by a pair of nippers, and which was found to be a most efficient apparatus. A work of this kind, with a bore-hole of 14 ft. diameter, was now going on at the extreme south of Paris, under the direction of M. Mulot. The precision and regularity of this work, although so gigantic, were beautiful to witness. The cutting-tool, and the short piece of rod which fell with it, weighed 3000 kilogrammes, which would be about equal to 3 English tons, and though they were boring sometimes in a granitic mass, and sometimes in chalk and flint, they were making great progress, considering the size of the bore-hole. It was found convenient in dealing with these long rods to have shears, or a pulley-frame, erected over the bore-hole; and when they could be put up 60 or 70 ft. above the surface, so as to unscrew several lengths at once, a great saving of time was effected. Whether this could be done or not, the mining engineer, if he had charge of any such works, should be careful to make arrangements at the surface by which the different sections of rods, as they were detached, could be placed in regular rotation, and thus no time be lost and no difficulty experienced when they had to be replaced.

The engineering arrangements at the Paris works were of the most complete character, and in the office of the master borer specimens of the material at different depths were arranged in proper order, and thus furnished a record of all the beds passed through from the beginning of the operation. These borings at Paris were designed for the purpose of making an addition to the water supply. The quantity raised by the older wells of Grenelle and Passy was not sufficient, and it had been recently resolved to sink two still larger wells—one at the extreme north, and the other at the extreme south, of the city. The execution of the work was confided to the two most distinguished engineering firms, who seemed to vie with each other as to which should carry out the operations in the best style. Various contrivances had been suggested from time to time, for the purpose of simplifying the work, and lessening the cost of these operations. When they remembered that to carry these bore-holes to such depths required from two to six years, the constant labour of a great number of men and steam-engines as well, they would see that it would be a great boon if the system of boring could be cheapened. With this view, M. Beart, of Fauvelle, many years ago, tried a plan, which consisted of a single tube all down, through which a current of water was passed, and the dislodged material by this means forced to the top, and so the time of screwing and unscrewing was saved. A very remarkable case in which this plan was tried had been recorded. North of the Pyrenees, somewhere near Perpignan, a hole was sunk in 23 days, which was 170 metres in depth. In fact, the time was even less, as there were really only 140 working hours employed in the cutting—a rate of speed almost incredible, and only to be understood by the continuous action of this kind of instrument, and by the fact that a considerable portion of the rock cut through was of a sandy nature, and, therefore, easily brought up by water. There were, however, other cases of holes sunk by this method in a few days, which would have taken 12 months to penetrate by the ordinary means. The system, however, could only be looked upon as experimental, as it obviously could not be carried out to any great depth.

[We shall publish several Lectures in next week's Journal.]

Government Inspection of Coal Mines.

THE INSPECTORS' REPORTS.

Referring to the prevention of accidents in collieries, Mr. T. E. WALES (SOUTH WALES DISTRICT) remarks, that with a view to guard as far as practicable against such fearful explosions as have unhappily occurred in Yorkshire and Staffordshire during the past year, every possible means should be resorted to, not only to prevent the inflammable gas from escaping from the goafs or old works (parts where the coal has been extracted) on to the workmen's naked lights or safety-lamps, but also, as far as possible, to clear such goafs of gas, so that in case of a fall of stone there, or a sudden fall of the barometer, there shall be little or none to be forced out.

If such a system or principle of working coal as would always have the goafs or old works on the rise of the working faces or places (which he thinks practicable), with good air-ways maintained on the rise of such goafs, and a free communication between the two was adopted, both the foregoing (the prevention of gas passing on to the workmen's lamps, and ridding the goafs of gas) would in a great measure be accomplished; but where the contrary is the case—*i.e.*, where the goafs or old works are below or on the lower side of the working faces or places (which is the mode generally adopted)—it is difficult, from the natural tendency of the carburetted hydrogen gas to ascend, to prevent it passing up and into such working places. He has met with colliery managers who contend that the safety-lamp is intended to meet such contingencies; but when the great care requisite to see that the lamps (safety) are fit to undergo such an ordeal, and the constant attention required by those (who are for the most part engaged in hard manual labour) using them (lamps), are borne in mind, the discovery of any trifling neglect cannot, he thinks, be wondered at; and, therefore, the greatest care is incumbent upon all intrusted with the management of collieries to prevent (as far as our present knowledge of mining can do so) gas being brought in contact with the workmen's lamps. He would strongly and sincerely recommend all colliery owners to exercise the greatest care in selecting able, experienced and careful persons to act as their colliery managers, and in no case to allow pecuniary considerations to weigh against the safety of the lives of those engaged in their mines. And to the managers he would also recommend that they give their undivided attention to the safety of the people employed under them, and in no case to allow a breach of any rule to go unnoticed. They should also exercise great care and attention in selecting overmen, firemen, and other officials, to whose judgment and care often hundreds of lives have to be entrusted; and in all mines at all fiery to introduce working with safety-lamps, and under such circumstances to disallow the firing of shots; to have properly appointed places in the fresh air, and in no case far from the bottom of the downcast shaft, with experienced and careful men at such places, for re-lighting the safety-lamps, and to strictly enforce a proper examination of all working places and roads leading thereto before the colliers proceed to their work, each and every morning.

He would also strongly point out to the workmen the great necessity of their exercising great and constant care in the performance of all their underground duties, especially with regard to the proper treatment of the safety-lamp, and due observance of all the colliery rules, and in no case to allow the violation of any rule which may come under their notice to pass without being duly reported to the officials in charge of the pit.

With regard to the WESTERN DIVISION OF SCOTLAND, Mr. WM. ALEXANDER reports, that in consequence of the frequent interruptions to labour which take place throughout the collieries situated in this mineral field, it seems desirable that some explanatory reason should be offered as to the cause. Coal, being of importance in nearly every branch of manufacture, is to a considerable extent affected in value by the commercial changes which are constantly taking place. In some mining localities, where the owners are principally engaged in the coal trade, these changes are scarcely appreciable; but in districts such as this, where apparently there are two distinct mining interests, coal and iron, they are more frequent and less uniform. For example, at the commencement of the year the price of pig-iron was upwards of 30 per cent. higher than it was six months after, and during that time the wages of underground workmen were nearly equal. If during the time that high prices were obtained the maker paid at a corresponding rate for the raw materials, it follows that under a falling market, unless he can reduce in a proportionate degree the several items of cost, the enterprise must soon fail to be remunerative. Miners cannot be classed as day workmen; they are not limited to produce a certain amount of work, and there may be various rates paid per ton at one time in the same mine. To effect the required modifications and adapt the wages of the workmen to meet these variable commercial changes is often difficult. For in such cases the producer of iron has not only to compete with those engaged in the same trade with himself, but he has to meet in the labour market with those who, if wholly engaged in the coal trade, may have no immediate interest in either lowering the price of coal or making such changes as may affect its production; and in the same way with a flourishing iron trade the state of matters may to a certain extent be reversed. On the other part, it is not surprising if workmen employed in the same description of labour, in mines adjoining and worked under exactly the same conditions, should not be able to discriminate clearly at all times why they do not receive an equal rate of remuneration for it, and when the only apparent difference to them may be that the produce of the one mine is consumed in the manufacture of iron, and the produce of the other for household use and manufactures generally. Under these circumstances, he is afraid, it is too much to expect that such changes will ever be made quite amicably and to the satisfaction of all parties; and apprehends that it is greatly owing to this peculiar state of things—two distinct mining interests, not always always alike active and remunerative—that there are so many vexatious disputes, often resulting in strikes, throughout the collieries of this district.

Referring to the Act rendering the provision of two outlets compulsory, Mr. Alexander observes that the statute is explicit in the prohibition of single shafts; but it is, perhaps, proper to explain that by the existing mode of enforcing compliance, endless opposition can be given to it. For example, the Procurator Fiscal of Kilmarnock, in April, 1865, three months after the Act came into operation, was instructed by the Lord Advocate to take proceedings in the Sheriff's Court against the owners of Maxwood Colliery, for the purpose of enforcing compliance by interdict or injunction. In Scotland these cases are proceeded with in civil form, not criminally; under such circumstances it is apparent that if there is a desire to protract the litigation and delay the decision, there are many ways of doing it. In the present case objections were taken to the jurisdiction of the Sheriff and to the title of the Procurator Fiscal to sue, and various technical points were started which, though of no consequence, tended greatly to delay the proceedings; and being all conducted before the Sheriff Substitute various appeals were made to the Sheriff Principal. After all preliminaries were arranged a proof was allowed, which was not closed till the end of 1865, and on Jan. 31, 1866, the Sheriff Substitute granted interdict. The judgment of the Sheriff Substitute was reviewed by the Sheriff Principal, and confirmed in March, 1866. The next proceeding was to appeal to the Court of Session, where the case has been litigated since, and on Jan. 31, 1867, the decision of the Lord Ordinary, adhering to the judgment of the Sheriff and Sheriff Substitute, was declared. It is still in the power of the defendants to carry the case to the Inner House of the Court of Session, and if the judgment there be still unfavourable they may carry it to the House of Lords.

During these proceedings the owners of the colliery in the latter part of 1866 completed their connections, by which a second means of egress was made from the various workings of the colliery. There is no penalty of any consequence attached in case of violation of this statute, and the only thing likely to deter anyone who may not wish to comply immediately with the requirements of it is the expense which must ultimately be incurred for carrying on the litigation. He presumes the Legislature never contemplated that the salutary effects of the statute might be set aside for years, in the case of any litigious owner who might choose to follow the course which has been adopted in this case; and he would suggest that, in the event of any change in the law relating to mines, something more stringent and effective should be introduced, which, if it did not enforce immediate compliance, would have the effect of preventing such unnecessary and vexatious delays. As the law now is, such cases may be taken from court to court, and it is possible that while appeals are being made some unfortunate accident may happen, and for want of a second outlet sweep off the whole of a pit's crew.

There are other two cases at present being conducted similar in form to the one described. The mines were "existing mines" at the passing of the Act, in 1862; and up to this time they have been worked in wilful violation of the statute; and the workings in both cases are closely situated to old mines lying full of water. Such acts of violation have a bad effect in a mining district, and particularly in such cases as the present, where a few mine owners are apparently exempted from outlays such as their neighbours, who in rendering a full compliance with the statute, have been obliged to make.

The general rules of the statute 23 and 24 Vict. c. 151. are binding upon all colliery owners, and in the case of violations there is a penalty of 20*l.*; and also, in case the default or neglect be not remedied with all reasonable dispatch after notice in writing thereof given by an Inspector to the owner or agent of such coal mine, to a further penalty of 1*l.* for every day during which the offence continues after such notice. He is of opinion that there should also be a penalty of at least 20*l.* for violation of the statute 25 and 26 Vict. c. 79., and, in addition to the injunction provided for by the sixth section of the statute, a penalty of 5*l.* per day for every day during which the offence continues after notice thereof has been given. Such a provision would not interfere with anyone honestly trying to do right; it would have the effect of checking or preventing endless litigation, and the result would be that a more rigid and systematic compliance with the statute would be obtained.

Mr. Alexander had occasion to lay before the Home Secretary a decision of Sheriff Strathearn's, given in the Sheriff's Court, Glasgow, relating to the 15th general rule of the statute 23 and 24 Vict. c. 151. In his interlocutor attention is called to the uncertain meaning of the term "a working." As this rule is undoubtedly one of the most important of the general rules, it ought to be expressed so as not to admit of doubt as to its meaning, and he now suggests that the following be substituted for it :—Every place likely to contain a dangerous accumulation of water shall be approached by narrow mines, or places not exceeding 12 ft. wide, in which there shall be at least one bore-hole kept constantly in advance not less than 12 ft., and with flank bores on each side never more than 10 ft. distant from the face, and not more than 10 ft. distant from each other.

THE FERNDALE COLLIERY EXPLOSION.

The inquest upon the 178 sufferers from this explosion has concluded with a verdict attributing the explosion to the negligence of the late Mr. Williams, the manager, in permitting the gas to accumulate, and to the carelessness of the colliers in taking off their lamp tops and working with naked lights. The jury considered that Mr. Williams's neglect was "not criminal;" the verdict is, therefore, equivalent to one of "Accidental Death."

Probably, the most important evidence taken, except the depositions of those connected with the pit, was that of Mr. LIONEL BROUGH, the Government Inspector for the adjoining district. He said that—

Mr. Wales having applied for assistance in the matter of the Ferndale explosion, I was ordered by the Secretary of State to join him. I accordingly met him on Nov. 12, and went down the pit, and continued there many other days. Since then I have attended the inquest, and listened very attentively to all the evidence, and especially to that of Mr. Richard Bedlington; but in some points I differ from him altogether in opinion. There is no more reason to suppose that the first explosion occurred in the Blaenllechan than in the Rhondda. It is but just to observe that two open lamps were found in the Globach district. Up to this time no open lamp has been found in the Rhondda. We found in the Rhondda four lamps, which were not locked. Mr. Harrison, Mr. Edward Daniel, and myself brought them out. However, many more than those are already on record, and I entirely agree with Mr. Bedlington in the probability that the Globach gas ignited from one of the open lamps; indeed, I have no doubt about it. This explosion and some others do not involve the actual necessity of the presence of unprotected flame. For many years I have had my suspicions both of the Davy and of the Clanny, and recent experiments (at one of which I assisted) showed that these lamps will pass the flame at comparatively low velocity. This is a very serious matter, but those details will be made public; indeed, I believe they are already in print, and I have only to add that the gentlemen who made the *principal* experiments, which, in fact, I had nothing whatever to do with, are men of the greatest skill and probity. The point on which I do materially differ with Mr. Bedlington is not one of lamps at all. Any opposed opinion between that gentleman and myself on that subject is easily reconcilable. It is on a matter of graver importance that we disagree—whether the doors were kept open for some time by two journeys of trams getting off the rails, and all ventilation consequently, cut off from the working in John Davies's heading, in the Globach. I fear there was quite gas enough in that district to account for the explosion without opening those doors, or any other doors at all. I must support Mr. Bedlington in his view that there were two explosions. Extraordinary as it may appear there really were two—each separate and distinct from the other, but whether first in the Globach or in the Rhondda is immaterial. One became contingent upon the other, and was a sword that cut both ways. With regard to the timbers in the Rhondda having been blown and bent upwards, I must confess it would, on the first view, indicate the rush of a blast in that direction. But sometimes such indications must be received with a certain amount of reservation, for it has been known in explosions that timbers have escaped the blast, but have given way before the tremendous rush of air technically called the "suck" of the pit. Fire-damp once ignited, the combustible (light carburated hydrogen) and its supporter (oxygen) combine with such exceedingly astonishing rapidity that partial vacuum ensues, and the air, rushing from one of the pits, and other parts of the colliery, to fill it up, often resembles a second explosion in the mischief it perpetrates and in the disturbance it brings about. Indeed, it may with some lead to the opinion that another explosion has actually occurred, when such, in reality, has not been the case at all. Timber is occasionally prostrated in a manner to induce the opinion that it was lying in a direction contrary to the initial blast. However, I beg here to repeat my firm conviction that there really did take place an explosion at different points—one remote and far away from the other. At the Risca Colliery an idea presented itself that there had been two explosions, but proof to that effect was by no means elicited. It is not in general accordance with colliery experience that two such events should simultaneously occur from totally distinct causes. Both at Risca and Ferndale there can be doubt that if gas ignited in more than one place, the second event must have resulted from the initial explosion, wherever that might have taken place. Evidence has been given that they were troubled with gas both in the Globach and at the top of the Rhondda; therefore, the undulating waves of air occasioned by the one explosion would shake gas out of any receptacle that might exist in the far distant district, and then an open or a defective lamp would supplement and complete the catastrophe. It matters not whether a minute or the quarter of a second intervened, for in acoustics the one is quite as true a period of time as the other. By measurements made when in the pit with Mr. Wales we found from 112,000 to 134,000 cubic feet of air passing per minute; but when the pit was in its normal condition, and all the currents sweeping round the coal faces, I should think there would be generally about 100,000 ft. per minute. That quantity, properly dealt with, I should really myself consider sufficient; but if they wanted more it would not be difficult to get it. The upcast is an admirable pit, as, indeed, is the downcast, and a stack on the flue-shaft, of 20 yards in height, would greatly augment the quantity of wind. I have already stated there ought always to be air in excess, to guard against leakages and sudden emanations of gas, so that if the viewers found that 100,000 ft., or any other given quantity, did not sufficiently provide for these contingencies they could easily get what they required, as above, or even by building a second furnace at the bottom of the upcast. The managers of the colliery would be the parties to know best its requirements. I myself never saw the pit till after the explosion: 100,000 ft. of wind is a large supply, and Messrs. Davis have spared no expense to arrive at it, so that it is hard indeed for them to undergo so great an affliction as we are now investigating, but I fear the wind was sometimes throttled at the faces. The owners, with a view to increased safety, had also adopted, in some degree, the panel system, and to this I attribute the saving of over 100 lives in the Dyffryn district. This in itself is a great consolation. When I speak of throttled air I mean that the passage from stall to stall may at times undergo neglect, and be allowed partially to choke up. An instance of this kind was remarked by some of us after the explosion in two or three of the stalls in John Davies's level. We found the air checked, and on examination we arrived at the conclusion that there flowed just then about 1500 ft. of air per minute. Now, all around that face of work they really required more than ten times as much. This, of course, was after the explosion, and in that state when we could not fairly expect that everything should be in proper order; but it may be remarked that such a condition of circumstances might have existed before the terrible explosion. If so, I think that neglect may be chargeable to the viewership. At all events, it could not be chargeable to the owners; anyhow, that is the feeling which exists in my mind on the subject. The Rhondda return windway looks ample, but then, as the drag is directly in proportion to length—and the Rhondda air-course is long indeed—I think it would not be out of the way on my part to say it would be well to open it out larger, or duplicate it by another, if such could be performed. The Rhondda district requires all that can be done for it by reason of its great length, and also because towards the far end—there or thereabouts—there is some soft coal, with a great liability to blowers. There should be a barometer in a cabin within a reasonable distance of the bottom of the downcast, where a record should be kept in a book of the height of the column of mercury day after day, and in fact at all times. The employment of scientific instruments may be an additional safeguard—indeed, the mere use of them sets people thinking, and the more thought the more safety. However, there are requirements of greater importance than instruments. Viewers should not only be practical persons, but possessed of considerable scientific attainments. The overmen, firemen, and wastemen should be selected from the best informed and steadiest of the working class, and, above all, the strictest discipline should be maintained in the pit. Unless all those conditions are arrived at, I fear there will be but small immunity from explosion. The partition which separates life from death is so thin and frail underground that relaxation from discipline should never take place—not even for one single moment. I think there is considerable leakage through those gobs, so that if the principal roads were in coal the wind would get better to the faces. I wish also to remark that it is not a desirable method to let the men buy their safety-lamps at any shop they please. It is far better the company should get the lamps from an approved manufacturer; and, finally, I may say that, this being a locked-lamp pit, I recommend that the use of gunpowder be entirely abandoned. The discharge of shots may, and no doubt does, have the effect of driving gas out of the gobs. There must be leakages under such circumstances, and the further the workings are pushed on from the pit the more formidably this danger increases. Nearly my concluding remark is that, within a certain space of time before and after the Ferndale explosion, great electric disturbance took place in Europe, America, and Asia. Heavy

gales of wind in England, Vesuvius in action in Italy, hurricanes and earthquakes in the Virgin Islands, and cyclones in the East Indies. It is also immediately on our minds that within the period I am recording four to six explosions occurred, one of them, so far as we read, sweeping off 100 persons in France. It is also to be remembered that at or about the time of the Oaks and the Talk-o'-the-Hill calamities meteorological occurrences of somewhat similar kind had been observed and recorded, though those singular cosmical phenomena were certainly not exerted in the alarming manner which we have read of in the present year. I may, therefore, say that it is not at all unreasonable that I should fall back on an idea, long entertained by myself, that our underground pursuits may be influenced by such extraordinary visitations. I have now only to report that whether in the Rhondda or the Globach, at whatever point the pit first fired, it is in evidence, solemnly sworn, however reliable that may be, that there had been met with gas enough in both the far away districts to account for the explosion. All that was needed to scatter death and destruction was a naked light, a defective lamp, or unskilful handling; and then, if all the statements we have heard are true, an explosion would be the inevitable result. The lamp management does not appear to have been perfect. That department is of a most serious and onerous kind. That, combined with good viewership and rigid discipline, would go a long way to lessen and mitigate the disasters that coal-mining is liable to. Out of 350,000 persons employed, something like a thousand are killed off every year. Such a terrible per centage of death is a matter of the gravest consideration. We ought all of us to exercise our best exertions to lessen in some degree this great calamity. Every coal miner who is struck down becomes a mournful affliction to his family, and a serious loss to the general community.

Mr. T. E. WALES, the Government Inspector for the district, concurred generally with Mr. Brough; he considered that 100,000 ft. of air per minute carried to the coal faces ought, if properly distributed, to have been sufficient to thoroughly ventilate the mine in its normal condition. It was questionable, however, whether the colliery was in its normal condition at the time of the explosion, and there was evidence to show that there was gas in John Davies's level, Blaenllecha, and the Rhondda workings, gas having been seen in Rhondda main level on the Tuesday before the explosion. The custom was to lock all the safety-lamps above ground at the lamp-room or at the lamp station as they were passed. There was no evidence to show that that rule had been broken, but, unhappily, he could not say the same of all who used safety-lamps. The pit was evidently subject to sudden outbursts of inflammable gas by blowers. The discharge of gas from blowers was often intermittent, so that a place might be quite free and safe now, and yet be rendered highly dangerous in a short time. On the long wall principle of working coal the only escape for gas issuing from gobs or goafs was up or down into the faces where the men were working. Such being the case, the greatest possible amount of air should be passed to the faces; shot-firing should not be allowed, and the strictest discipline, especially in regard to the safety-lamp, should be enforced.

The CORONER then summed up, and after two hours' consultation the jury returned the following verdict:—

"We have come to the conclusion that the deceased met their deaths by an explosion of gas in the Ferndale Colliery, on November 8. We believe the explosion took place in consequence of a great accumulation of gas in certain workings of the colliery, and this accumulation we attribute to the neglect of Mr. Williams, the manager, and his subordinate officers, and by this gas being fired by one or more of the colliers carelessly taking off the tops of their lamps and working with naked lights. We much regret that the proprietors of the colliery did not permit the deputation from the Miners' National Association to go into the pit, especially as the coroner gave them a letter of recommendation, with a view of their being allowed to go down. We are of opinion that the inspection of collieries, as hitherto practised, has entirely failed as a preventive to accidents of this kind, and we recommend that all collieries should be henceforth inspected by a competent person at least once in every three months. We further recommend that all collieries should be provided with scientific instruments for measuring the quantity and quality of the air passing through the colliery, and that a daily record should be kept of the same. Also that a register of the daily report of the fireman be kept in the office of each colliery, and that a register of the names of every person who descends into the pit be also kept."

FOREIGN MINING AND METALLURGY.

Attention has been directed a good deal of late to the coal basin of the Sarre, and especially to the Ottweiler Mines, which are remarkably rich in mineral combustible, and to acquire which a French company has recently made great efforts. Proceedings with reference to the mines in question have been for some time pending against the Prussian Government. It appears that the mines belonged to the family of the Counts of Pappenheim; the members of that house are numerous, and one of them sold the property at a low price to the Prussian Government, without applying to his co-proprietors to ratify the sale. The proceedings now pending have been taken by the present head of the family, who considers himself injured by what he regards as an irregular sale. It appears the profits realised in its last financial year by the Rocheux and Oneux Company (Belgium), admit of the distribution of a dividend of 12s. per share, or 3 per cent. on the paid-up capital. The total redemptions effected to the present date, as well on premises as on working plant, amount to 34,113*l.* The reserve has been increased during the past year to the extent of 467*l.* The company sold during the exercise 25,635 tons of various minerals, showing an augmentation of 6130 tons, as compared with the previous year. The extraction amounted in 1866-7 to 31,126 tons of rough minerals, which produced 26,561 tons of prepared minerals; pyrites entered into this total for 2228 tons, lead for 1177 tons, and iron for 4735 tons. We may estimate the daily extraction at 100 tons of rough minerals. The various works executed by the company in 1866-7 absorbed a sum of 8055*l.* The redemptions effected during the past exercise, out of the excess of the rough receipts over the general expenses, amounted to 5193*l.*, a result which will be regarded as favourable.

The exports of coal from Belgium for the first ten months of this year amounted to 2,914,563 tons, while in the corresponding period of 1866 they were 3,242,080 tons, showing a falling off of 327,437 tons this year. The exports of coke present also a decline this year, as compared with 1866, having fallen to 440,841 tons to Oct. 31 this year, as compared with 456,720 tons in the ten corresponding months of 1866. The diminution here indicated is of no great importance, but it may possibly increase as regards the whole year, as the stagnation observable for some time past in affairs has far from ceased. The exports of October, taken by itself, were 10,000 tons less than those of the corresponding month of 1866. The imports of coal into Belgium in the first ten months of this year were 344,125 tons, as compared with 109,710 tons in the corresponding period of 1866, and 63,291 tons in the corresponding period of 1865; the imports thus appear to be sensibly extending. Prussia figured in the imports made in the first ten months of this year for 163,596 tons, England for 124,234 tons, and France for 55,280 tons. The augmentation in the imports from Prussia this year has been more considerable than in those from Great Britain. There is no material change to note in the tone of the coal markets of the different basins; there have been some considerable transactions of late in engine coal. During the first ten months of this year the exports of pig from Belgium only amounted to 9407 tons, against 13,078 tons in the corresponding period of 1866; the falling off observable in this year's exports reflects the diminished activity of the Belgian pig-iron market. The exports of Belgian pig to the Zollverein this year have especially presented an important diminution; thus in the first ten months of 1866 they amounted to 2923 tons, while this year they have declined to 633 tons: the difference is so considerable that fears are entertained that this outlet will be completely closed some day. If we examine the imports of pig into Belgium, we find a total for the first ten months of this year of 47,044 tons, as compared with 27,000 tons in the corresponding period of 1866, and 17,500 tons only in the corresponding period of 1865—another unfavourable element with which the Belgian blast-furnaces have to contend. The exports of rails during the first ten months of this year amounted to 74,268 tons, as compared with 60,698 tons in the corresponding period of 1866. The augmentation of 14,000 tons observable in the exports of this year arises almost entirely from the increased deliveries of rails made to Russia, from which country, as we have more than once indicated, Belgium has received this year some important orders. Thus while the exports of rails to Russia were only 31,916 tons in the first ten months of 1866, they amounted in the same period of this year to 62,595 tons. This augmentation arises from special orders to meet the requirements attending the network of lines now in course of completion in Russia. On the other hand, Belgium had not sent to Oct. 31 this year a single ton of rails to Sweden, Portugal, Turkey, Egypt, United States, and Cuba, although in the first ten months of 1866 the following quantities were exported:—Sweden, 17 tons; Portugal, 1484 tons; Turkey, 1490 tons; Egypt, 200 tons; United States, 1490 tons; Cuba, 20 tons, &c. Even the aspect of the figures relating to the exceptionally large deliveries to Russia is not altogether satisfactory, as the exports of rails to the Czar's empire only amounted in October to 815 tons, as compared with 4868 tons in October, 1866, from which it is inferred that the Russian demand, which has been the salvation of the Belgian rail trade this year, is now falling off. Russia, there is no doubt, is making efforts to preserve to her national industry as much as possible the great metallurgical works to which the construction of her railways is giving rise. Thus, the construction of an iron bridge proposed to be thrown across the Boug, on the Warsaw and Terespol line, for the construction of which tenders had been invited from a dozen Russian and foreign establishments, has been let to a Russian firm. Further, we learn that the Russian Government intends to order an important quantity of plant, including engines and tenders, from four works on its own territories, which will thus be assured work for several years. The Government will make for this purpose considerable advances of money. The exports of plates during the first ten months of this year amounted to 10,629 tons, as compared with 14,090 tons in the corresponding period of 1866, showing a diminution of 3460 tons this year. This fabrication is one of those which have suffered the most from the crisis which has afflicted Belgian industry for a year past. The exports of minerals have remained almost stationary this year, having amounted, up to Oct. 31, to 135,800 tons, as compared with 136,819 tons during the corresponding period of last year. The imports of minerals also show but little variation, having been 268,600 tons in the first ten months of this year, as compared with 263,900 tons in the corresponding period of 1866. The Ougrée Collieries and Blast-Furnaces Company will pay, Jan. 2, a dividend of 8s. per share for 1866-7. The Levant du Flenu Collieries Company will pay, Jan. 2, interest for 1867, or 2*l.* per share. The North of Charleroi Collieries Company will pay, Jan. 1, interest for 1867, or 1*l.* per share. The Boussu, St. Croix, and St. Claire Collieries Company will pay, Jan. 2, 2*l.* per share for 1867. The Bonne Esperance and Batterie Collieries Company will pay, Jan. 2, a dividend for 1867, or 1*l.* per share. The Hornu and Wasmes Collieries Company will pay, Jan. 2, interest for 1867, or 2*l.* per share. The Sars Longchamps and Bouvy Collieries Company will pay, Jan. 5, interest for 1867, or 2*l.* per share. The Thy-le-Château Blast-Furnaces Company will pay, Jan. 2, interest for 1867. Meetings are announced as follows:—Bois Collieries Company, Dec. 30, at Quaregnon; Haine St. Pierre Forges, Ironworks, and Foundries Company, Jan. 9, at Brussels.

It appears that in the first 10 months of this year 44,000 tons of pig were imported into France duty free, as compared with 75,600 tons received on the same conditions during the corresponding period of last year. During the same periods the imports of pig, with payment of duties, were 74,200 tons this year, as compared with 49,600 tons in 1866. The total imports of pig into France in the first 10 months of this year were thus 118,200 tons, against 125,200 tons in the corresponding period of last year, showing a decline of 7000 tons this year. It is singular that the imports, free of duty, should have declined this year, while those made with payment of duties have considerably increased. The imports of iron and plates into France showed an augmentation of about 5000 tons this year; this augmentation arises, for the most part, under the head of imports with payments of duty, although at the same time the imports made duty free also present a slight increase. The imports of minerals into France during the first 10 months of the current year were 446,000 tons, as compared with 391,000 tons during the corresponding period of 1866, showing an increase of 55,000 tons in 1867. The increase is especially observable as regards the deliveries from Algeria, which rose from 87,800 tons in the first 10 months of 1866, to 152,700 tons in the first 10 months of 1867. The state of the French iron markets remains much the same; prices are, however, very variable. Meetings are announced as follows:—Colliery and Metallurgical Company of the Asturias, Dec. 30, at Paris; Cruvino Mines Company, Jan. 22, at Paris; and Denain and Anzin Blast-Furnaces and Forges Company, Jan. 24, at Paris.

The foreign copper markets have not presented much change. At Havre, Chilian in bars has made 71*l.* to 72*l.* per ton; Peruvian mineral, 76*l.*; United States (Baltimore), 80*l.* to 82*l.*; Lake Superior, 80*l.* to 97*l.*; Mexican and Plata in bars, 70*l.* to 72*l.*; Russian, 88*l.* to 90*l.*; old yellow copper, 44*l.* to 52*l.*; red ditto, 68*l.* to 69*l.*; bronze, 66*l.* to 68*l.* per ton. At Marseilles, Toka for consumption has brought 74*l.*; Spanish 72*l.*; refined Chilian and Peruvian, 80*l.*; old red copper, 64*l.*; Levant ditto, 64*l.*; rolled red copper for sheathing, 88*l.*; yellow ditto, 82*l.* per ton. At Paris, English in plates has made 78*l.*; Lake Superior, 88*l.*; Chilian, 72*l.*; and Corocoro mineral, 74*l.* per ton. At Amsterdam and Rotterdam, Banca tin has been dealt in in small lots, at 53½ fls. to 54 fls., while Billiton has made 53 fls. At Paris, Banca has made 97*l.*; Straits, 96*l.*; and English 95*l.* per ton. At Havre, Banca has realised 88*l.* to 90*l.*; Straits, 86*l.* to 88*l.*; and Peruvian, 85*l.* per ton. At Marseilles, Banca has been quoted at 98*l.* per ton. Lead meets with only a feeble demand, but preserves about former rates on the various markets. At Rotterdam, Stolberg and German have made 11¼ fls. At Paris, Spanish saumons have realised 20*l.*; French ditto, 19*l.* 12*s.*; English, 19*l.* 12*s.*; and German, 20*l.* per ton. At Havre, Spanish has realised 19*l.* 6*s.* to 19*l.* 8*s.*; lead from other sources has realised about similar terms. No very important transaction in zinc has taken place at Breslau and Hamburg; holders maintain previous prices—a circumstance which somewhat checks the course of affairs. At Paris rough Silesian has made 22*l.*; and zinc from other sources, 21*l.* 8*s.* per ton. At Havre zinc has been quoted at 21*l.* 12*s.* to 22*l.* per ton.

THE NEW SCIENCE—ATOMECHANICS.

The importance of a scientific discovery can never be judged of by the manner of its reception by the learned, for it not unfrequently happens that those which develope the greatest truths are precisely those which have the hardest struggle to obtain recognition; they usually necessitate the use of terms which are not familiar to us, and often require us to unlearn much that we have learned, and to cause our thoughts to flow in an entirely new channel. At a comparatively recent date Geology, now recognised as a science of paramount importance in connection with almost every branch of our national industry, was looked upon with suspicion, and geologists were generally considered to be either deluded enthusiasts or impostors; whilst at the present time the science of Atomechanics, or Chemistry considered as the Mechanics of the Panatoms, occupies a position not very dissimilar to that of Geology at the period referred to. The discovery of the existence of *pantogen*, which may be regarded as the primary chemical principle, just as gravitation is the primary mechanical principle, is due to Gustav Hinrichs, and dates from the commencement of the year 1855, when he was a student in the Polytechnic School of Copenhagen, founded by Oersted, and at that time under the superintendence of that distinguished chemist, the late Prof. Forchhammer. In 1856 and 1857 Hinrichs communicated a memoir upon Atomechanics to various *savants* and academies in Europe, and in his several papers, published between 1860 and 1866, reference to the subject has frequently been made; but it was not until the present year that a complete outline of the new science was printed, in the form of a large quarto lithographed memoir, transferred from the author's own handwriting, and elaborately illustrated with the necessary diagrams.

Atomechanics, as it is at present before us, is, as the author remarks, far from perfect, for he has only taken the first step into a boundless realm; but he has already done enough to prove that the study of the science will not be devoid of interest. He reminds us that the phlogiston theory was altogether extinguished by the discoveries of Lavoisier, and that it was only after the establishment of the beautiful laws of Dulong and Petit, Gay Lussac, and Mitscherlich, that chemistry could be reduced by the labours of Gerhardt to an exact science, whilst it remained for the great discoveries in organic chemistry from Liebig to Berthelot, and the spectral analysis of Bunsen and Kirchhoff to make the domain of chemistry as universal as that of astronomy: the history of astronomy since 1619, when Kepler's third law was discovered, may teach us what changes await modern chemistry. We may conclude, he observes, from the analogy between the history of astronomy and that of chemistry that there exists some general principle which will transform modern chemistry into a mechanics of the atoms, for about 50 years after Kepler astronomy had become a mechanics of the heavenly bodies. As the basis of this celestial mechanics is but a hypothesis, so a similar hypothesis may be pronounced with regard to the chemical atoms. Let us suppose that the atoms of the chemical elements only differ in regard to quantity, that is in regard to the number and relative position of the atoms of some one primary matter, just as the planets only differ according to the number of pounds of ponderable matter they contain, and its distribution around their axes. Since everything would thus be composed of this one primary matter, Prof. Hinrichs calls it pantogen, and its atoms panatoms. But this is a hypothesis? No doubt! Even universal gravitation is nothing more than a hypothesis; and, as this hypothesis is the fundamental principle of theoretical astronomy, so the hypothesis of pantogen explains the numerical relation of the atomic weights, and gives a simple, comprehensive, because natural, classification of the elements, that the chemical, physical, and morphological or crystallographic properties of the elements and their combinations may be calculated just as the orbit of a planet is calculated.

The panatoms, or atoms of pantogen, are necessarily equal; they must be considered as simple material points, totally devoid of all occult properties. When combined they are at certain fixed distances from each other. Three combined form necessarily an equilateral triangle; since this is the only position of stable equilibrium of three equal material points. More panatoms combining herewith in the same plane will continue this geometrical law, thus forming hexagons, &c., divisible into regular triangles. According as the figures thus formed, or atomares, are composed of equilateral triangles, or squares, the elements are divided into two orders, trigonoids (or metalloids) and tetragonoids (or metals). According to the geometrical outline of the atomare these orders are subdivided into genera: the species (or elements) correspond to given values of the variables expressing the geometrical form of the genus.

IMPROVEMENTS IN THE MANUFACTURE OF STEEL.—At a recent meeting of the Liverpool Polytechnic Society, Mr. J. HARGREAVES read a paper on the Manufacture of Steel from Cast-Iron, by the use of nitrates, and other oxidising salts, in which he observed that the chemical properties of the nitrates and chlorates have frequently been appreciated by other inventors and patentees, but they do not seem to have attempted to get over the difficulty occasioned by their rising too rapidly to the surface of the fused iron when it is poured upon these salts. Their action has in consequence not been controlled or regulated. Refined iron, for the manufacture of malleable iron in the puddling furnace, may be made by the use of about 3 per cent. of nitrate of soda, and 6 per cent. of peroxide of iron; steel by 8 to 10 per cent. of nitrate, and an equal weight of binoxide of manganese; malleable iron by 8 per cent. of nitrate, and 20 per cent. of peroxide of iron; in each case iron with 5 per cent. of carbon being used. But it was often suggested to him that the use of separate and special apparatus is objectionable, on account of its expense, as manufacturers are generally averse to any large outlay upon new processes; and that some mode of applying it to the ordinary puddling furnace would be very useful. But there was this difficulty to contend with, the puddling furnace is too hot for the introduction of the converting materials, and fixing them at the bottom, and could this be done they would be decomposed before the fusion of the iron could be commenced, to say nothing of their remaining till it could be melted, so as to allow the gases evolved to rise and act through the fluid metal. To get over this difficulty he makes the converting materials into blocks or balls, and fixes them on the ends of iron rods. These balls being made hard by drying, are ready for use. When the iron is fused in the puddling-furnace, and the boil has commenced, one of these balls is pushed to the bottom of the metal in the furnace—the products of its decomposition rise through the metal, causing rapid agitation, which is much more effectual than that produced by the puddler with his tools. After the ebullition has ceased, the rod is withdrawn and another put in its place. The time occupied in puddling is thus very much shortened, the labour very much reduced, fuel saved, and a better yield of metal obtained, in consequence of the soda forming a base which readily combines with the silicic and phosphoric acids eliminated from the iron. In the ordinary puddling operations the silicium and phosphorus are extracted, the previous formation of oxide of iron, with which those acids, which are also products of oxidation, combine. But when silicium and phosphorus are reduced to a somewhat small proportion of the whole, the last traces of them are removed with difficulty, still the powerfully basic character of [illegible] the disposition of these substances to separate from the iron, and to [illegible] combination with itself. The malleable iron produced from cast-iron which has been treated with nitrates is of a very superior quality, having great [illegible] temper. The same metal which by gradual cooling is fit for purposes [illegible] great toughness and powers of endurance of bending and torsion, may by rapid cooling be made sufficiently hard for wood-cutting tools; and its freedom from impurities is shown by the remarkably thin scale formed when the iron is worked by the smith, and the consequently small amount of loss in working. In this respect it very much resembles the best charcoal iron, and contrasts very remarkably with the iron made from the same "pig," but which has not been previously treated with nitrates. The presence of silicium causes a large amount of waste when malleable iron is exposed to the atmosphere at high temperatures, causing a thick, heavy scale, which must contain at least 70 per cent. of iron.

CORNISH PUMPING ENGINES.—The number of pumping-engines reported for Nov. is 23. They have consumed 1594 tons of coal, and lifted 11·9 million tons of water 10 fms. high. The average duty of the whole is, therefore, 51,100,000 lbs., lifted 1 ft. high, by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:—

Chiverton—Cookney's 60 in. ......Millions	55·3
Cargoll Mines—Michell's 72 in.	51·4
Chiverton Moor—70 in.	63·3
Cook's Kitchen—50 in.	54·2
Great North Downs—Sleggan's 70 in.	52·1
North Wheal Crofty—Trevenson's 80 in.	62·3
West Caradon—Elliot's 50 in.	53·2
West Chiverton—Hawke's 80 in.	83·2
West Wheal Seton—Harvey's 85 in.	68·7

LEVER'S MINING ALMANAC.—The edition of this handsome sheet for 1868 has just been issued by Mr. Ellis Lever, of the West Gorton Works, Manchester, and contains, in addition to the usual calendar matter, a large amount of useful information connected with colliery operations, embracing lists of the Government Inspectors, and of the officers of the North of England Institute and South Wales Institute of Mining Engineers, and various societies, &c., connected with mining and the allied sciences, as well as a condensed abstract of the mineral statistics last issued from the Royal School of Mines. The Almanac is well worthy of a place in colliery counting houses, and similar places of business.

LIABILITY UPON SHARES.—A proposed transferee of shares, who has acted as owner of them, will be liable in equity as a shareholder, notwithstanding he has neither executed nor registered the transfers. Vice-Chancellor Stuart thus held in the case of Shepherd *v.* Gillespie, which was a suit instituted by a stock and share broker against the defendant, a merchant and former director of the Joint-Stock Discount Company.

MINING LEASES.—In *re* Spencer's Trust, an application was made by petition, to Vice-Chancellor Malins, under the 17th section of 11 George IV. and 1 Will. IV., c. 65, that a lease might be granted of certain lands and coal mines in Staffordshire, for 42 years, at a rent of 100*l.* per acre. The lands belonged to infants, and were held in a number of undivided shares, the petitioners representing one-fourth of the whole. The only question was whether, inasmuch as the father of the infants was the tenant by courtesy, the case fell within the section. The Vice-Chancellor, in making the order, as prayed, said:—"I do not feel any difficulty when the Act says 'seized in fee or in tail;' it does not say in possession. I think that these infants are, in fact, entitled in fee, and therefore I do not feel any difficulty about the construction."

BORING MACHINES FOR CORNISH MINES.—The effect of one of these boring machines in operating on the hard rock in Cornish tin mines will be tested in a day or two, as Mr. Sykes' boring machines will be set to work at Tincroft one day this week. The power of the machines to compress a proper supply of air has been tested, and found highly satisfactory. Mr. Sykes makes a most reasonable offer to the mine,—to drive the levels at least 100 per cent. faster than they are now extended, at the same cost. He thinks in many cases that he can open most kinds of ground in deep levels 150 or 200 per cent. faster than they are now driven. If this can be done it will be a most important improvement in opening up deep and hard-ground mines. The cost of the machine is said to be about 400*l.* or 500*l.* When we take into account the want of proper scientific knowledge even among the best miners, the ignorance and recklessness of the larger portion, and prejudice of the remainder, combined with the settled objection of many mine agents to any improvement, especially in the way of introducing machinery of this description, we may expect to hear of the machine in many cases failing to do its work, being injured by carelessness or some other means. But the day is surely come when men who invest money in our mines will have the value of machinery properly tested. The "stone-breaker" is already a success at surface, and no reason can be yet assigned why the boring machine may not be equally so underground. Your correspondent of last week "Surveyor," tells of the almost marvellous rate at which Mr. Brunton's machine will bore our levels; 10 or 20 times as fast as we drive them is certainly rather too fast to be true, but if Mr. Brunton's can drive or sink three times as fast as we now do, we will set him as many bargains as he wishes for. Let him wait a week or two that we may see what Mr. Sykes is to do for us. In the meantime we may say to Mr. Brunton that we are very much obliged to him for the effort he has made. We consider there is great room in our mines for improved engineering, and we wish to have a word more next week with "Surveyor."—Correspondent of the *West Briton*.

"CWMDULAIS," OR GRAIG VAWR COAL.—Such is the name commonly given to a certain species of coal which occupies an extensive tract of mountain land belonging to his Grace the Duke of Beaufort, and extends from Graig Vawr, near Pontardulais, to Cwmclydach, containing an area of some thousands of acres, the thickness of the vein varying from 6 ft. downwards. The quality of the coal is of a bastard nature, being neither anthracite, free-burning, nor bituminous, and has only been used for limeburning and household fuel by the neighbouring farmers, who intermix it with clay forming a composition known among the peasantry as pelau or balls, from we suppose its being rounded by the hand into ball-shape, previous to being put on the fire, which when lighted, burns brilliantly, with a bluish sulphurous flame. It appears that that spirited speculator, Mr. John Glasbrook has leased some 800 acres of this coal, and has expended a considerable outlay in forming a railway to join the Llanelly and Swansea Extension in order to bring it to the market, and should it succeed as a steam generator, we most heartily congratulate Mr. Glasbrook and the neighbourhood on the prospect of a prosperous speculation. What we more particularly wish to draw attention to is the experiment Mr. Thos. Glasbrook tried on this coal for steam purposes, he having a small locomotive under which he used this bastard coal for raising steam, when it was found to answer admirably; and if by further tests and experiments it be found to answer for steam purposes we can afford to contribute our meed of thanks to Mr. Glasbrook for his spirited pluck in attempting to work a coal the quality of which was generally supposed not to become marketable until the bituminous veins in the South Wales mineral basin had all become exhausted. We wish every success in this new undertaking.—*Cambrian.*

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